ME ANG
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Scanning -- Shortwave -- Satellites -- Ham Radio -- Computers

Monitoring Times

A Publication of Grove Enterprises

Volume 22, No. 6
June 2003

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MT Flies with the Tankers

Tune in the Crisis in Korea
Scanning at Niagara Falls
Reviews: Uniden BC785D Scanner
and Ten-Tec RX-320 HF receiver

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EXPIRATION DATE 01/01/2004
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New AOR AR8600 Mark II (base) and AR8200 Mark III (handi) Receivers

The Choice of Professionals

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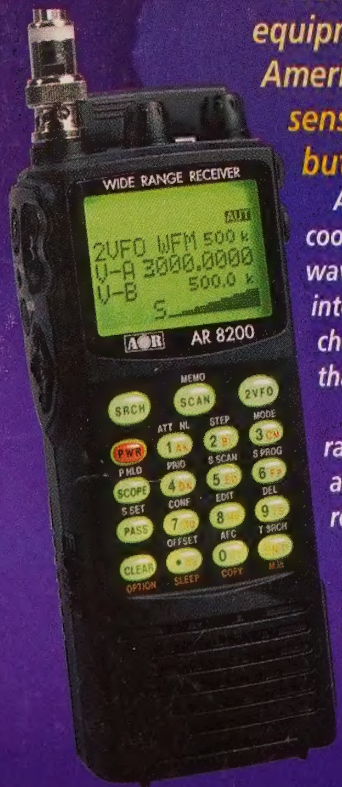
HIG
ELEVAT
GUARDED
LOW
AR8600 MARK II COMMUNICATIONS RECEIVER
AOR

AOR receivers are fast becoming standard equipment for government agencies across North America and beyond. Why? Quality, durability, sensitivity and selectivity are some of the reasons, but there are more.

AOR units are being used for surveillance and interagency coordination, they're patrolling our borders, riding the waves along our coastlines, helping to detect sources of interference and so much more. We're proud to be the choice of so many professional users and that's an honor that is earned, the hard way.

So what's your choice? When you want to monitor activity ranging up to 3 GHz, AOR is ready with the AR8600 Mark II and the AR8200 Mark III. We also have many other advanced receivers and accessories, check them out at our web site.*

*Sure, you could pay less for a discount-store receiver, but what you really want is what the "pros" are using, **AOR – The Serious Choice in Advanced Technology Receivers.™** AOR is only available through quality radio suppliers. See our web site for retailers.*



AR8600 MARK II Desktop/Mobile Receiver

We expanded coverage, upgraded the front end, and improved receive audio response. We also added display illumination control and we're working on an optional NTSC video module.

- Improved ultra-stable Temperature Compensated Crystal Oscillator (TCXO)
- Expanded tuning range: 100 KHz ~ 3 GHz *
- Receive Modes: WFM, NFM, SFM,WAM, NAM, USB, LSB, CW. Optional NTSC Video module available soon.
- New front end RF stages for superior sensitivity and selectivity.
- 2 VFOs (A/B)
- 1000 memory channels (20 banks X 50 memories/bank)
- 40 search banks
- Up to 37 channels/second search rate
- Five expansion slots, use up to 3 optional slot cards at one time. Available cards include: Tone Eliminator, CTCSS, Recording, External Memory.
- Accommodation for Collins® Mechanical Filters
- RS-232C port
- Download free control software from www.aorusa.com
- 10.7 MHz i.f. output (can be used with SDU 5500 Spectrum Display Unit or for secondary signal processing.)
- 12 VDC operation
- BNC antenna connection

Technology so advanced, it's patented (US Patent 6,002,924).

NEW! AR8200 Mark III Hand-held Receiver

Improved RF circuits combine greater sensitivity, resistance to intermod products and enhanced Signal to Noise ratios.

- New TCXO for greater stability – performance not found in most desktop units!
- Covers 500 KHz ~ 3 GHz – world's first handheld with this range!*
- Ni-MH batteries included (1500mAH)
- 1,000 memory channels (20 banks X 50 channels)
- 40 search banks
- 2 VFOs
- Alphanumeric channel and bank labels
- Computer control and programming. (requires optional connection cable)
- Download free control software from AOR web site!
- "All Mode" reception includes "super narrow" FM plus wide and narrow AM in addition to USB, LSB, CW and standard AM and FM modes
- True carrier reinsertion in USB and LSB modes. Includes 3 KHz SSB filter!
- Detachable MW antenna with negative feedback
- Optional internal slot cards expand the AR8200 Mark III's capabilities. Choose from Memory Expansion (up to 4,000 memories), CTCSS Squelch & Search, Tone Eliminator, and Record Audio (saves up to 20 seconds of audio)
- Tuning steps programmable in multiples of 50 Hz in all modes
- 8.33 KHz airband step is correctly supported
- Noise limiter and attenuator
- Band activity "scope" display with "save trace" capability
- Four-way side panel rocker switch allows one-hand operation
- Large, backlit, multifunction display and illuminated keypad
- Battery Save function with Low Battery indicator
- Operates on 12 VDC external power (adapter included)
- BNC antenna connector
- Wide choice of accessories

Discover why AOR receivers are the choice of many federal, state and local government agencies. Military users, laboratories and professional news-gathering operations also use AOR, the serious choice in advanced technology receivers.™

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Authority On Radio

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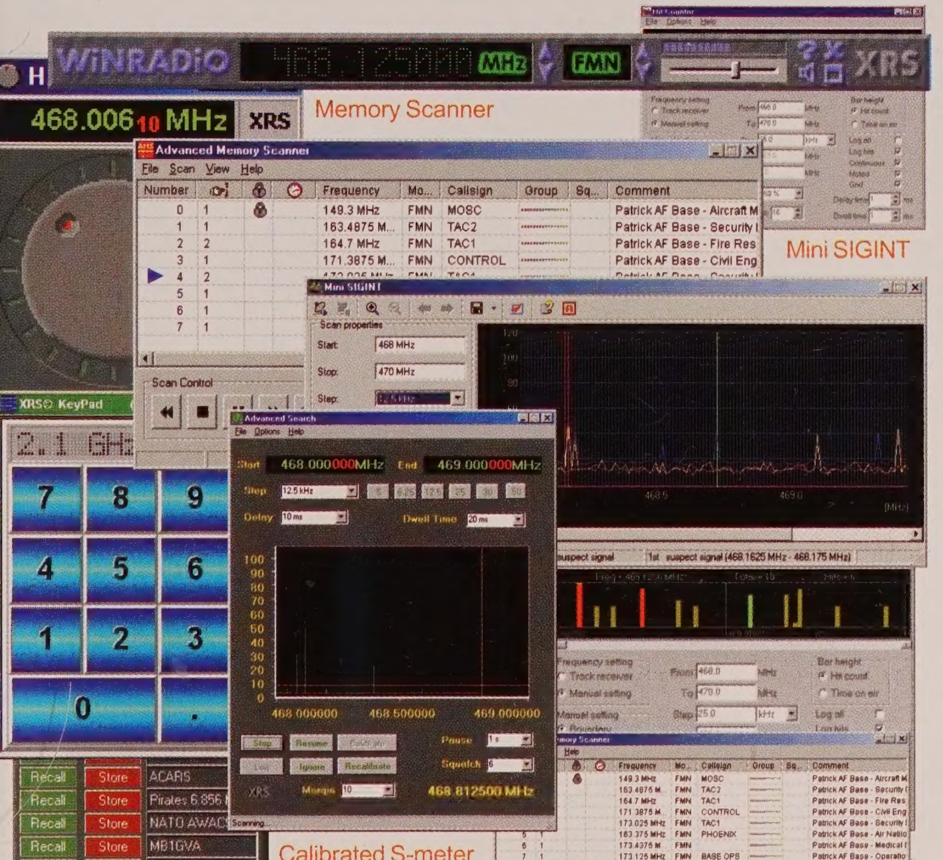
XRS®

a WiNRADiO® "Secret" is Out!


WiNRADiO
468.125000 MHz
FMN
XRS
468.006 10 MHz
Memory Scanner
Mini SIGINT
XRS© KeyPad
2.1 GHz
Advanced Search
Calibrated S-meter

Advanced Memory Scanner

Number				Frequency	Mo...	Callsign	Group	Sq...	Comment
0	1			149.3 MHz	FMN	MOSC			Patrick AF Base - Aircraft M
1	1			163.4875 M...	FMN	TAC2			Patrick AF Base - Security I
2	2			164.7 MHz	FMN	TAC1			Patrick AF Base - Fire Res
3	1			171.3875 M...	FMN	CONTROL			Patrick AF Base - Civil Eng
4	2								
5	1								
6	1								
7	1								

Mini SIGINT
Start: 468 MHz
Stop: 470 MHz

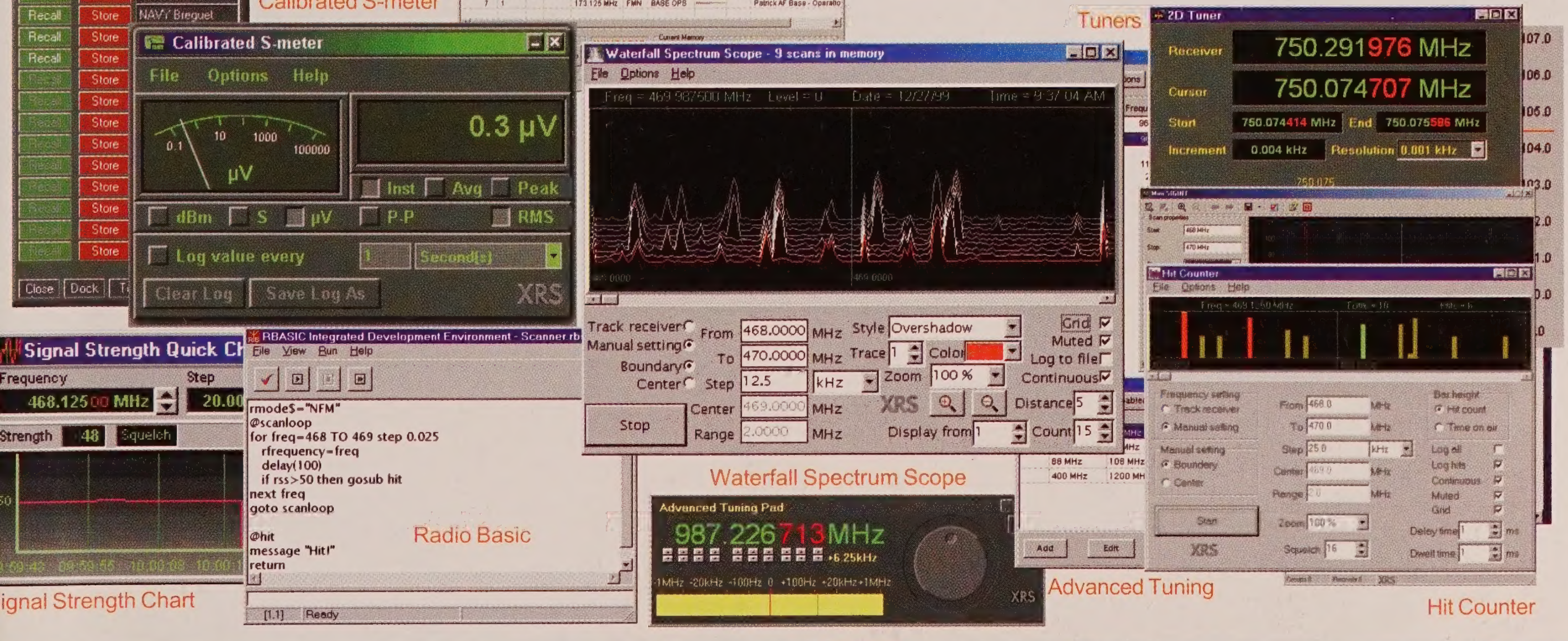
Advanced Search
Start 468.000000MHz End 469.000000MHz
468.812500 MHz

You may have heard about the flexibility of WiNRADiO receivers, and the significant amount of available software which exists to supplement them. The "secret" is in XRS - Extensible Radio Specification. This is a radio software interfacing standard to which all WiNRADiO receivers confirm.

Be it the popular WR-1550e wide-band scanner, the new ground-breaking WR-G303i shortwave receiver or the high-end WR-3000 series products, they all are compatible with XRS software plug-ins. And so will be future WiNRADiO products.

XRS plug-ins include numerous spectrum analysis and scanning tools, memory utilities, innovative tuning tools and many other useful facilities, many of them available for free to all WiNRADiO users.

XRS: Yet another good reason for owning a WiNRADiO.


Tuners
2D Tuner
Calibrated S-meter
File Options Help
0.3 µV
Inst Avg Peak
dBm S µV P-P RMS
Log value every
Clear Log
Save Log As
XRS
Signal Strength Quick Chart
Signal Strength Chart
Waterfall Spectrum Scope
Stop
Radio Basic
Advanced Tuning Pad
987.226713 MHz
Advanced Tuning
Mini SIGINT
Hit Counter
Hit Counter

2D Tuner
Receiver 750.291976 MHz
Cursor 750.074707 MHz
Start 750.074414 MHz End 750.075586 MHz
Increment 0.004 kHz Resolution 0.001 kHz

Waterfall Spectrum Scope - 9 scans in memory
From 468.0000 MHz To 470.0000 MHz Step 12.5 kHz
Style Overshadow Trace 1 Zoom 100 % Distance 5 Display from 1 Count 15

Signal Strength Quick Chart
Frequency 468.12500 MHz
Strength 48

RBASIC Integrated Development Environment - Scanner.rb

```
rmode$="NFM"
@scanloop
for freq=468 TO 469 step 0.025
   rfrequency=freq
   delay(100)
   if rss>50 then gosub hit
next freq
goto scanloop

@hit
message "Hit!"
return
```

[1.1] Ready

Get your free XRS plug-ins from:
xrs.winradio.com

Get your free Rapid Radio Application Development Tool from:
www.rbasic.com

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info@xrs.winradio.com

Monitoring Times

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Cover Story

Northeast Tanker Task Force

By Kevin Burke

Tanker Task Forces have had an intense workout this past spring in support of Operation Iraqi Freedom. The tanker KC-135s serve as a flying gas station for cargo, bomber, and fighter aircraft whose fuel reserves are not sufficient for transatlantic flights.

Author and photographer Kevin Burke had an opportunity to fly with the New Hampshire National Guard as part of the Northeast Tanker Task Force. This is his account of a Coronet refueling flight over the Atlantic.

Cover photo: A Maine Air National Guard tanker refuels an F-16 from New York. (Photo by Kevin Burke)

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Scanning the Honeymoon Capital 14

By John Corby

Tourist attractions are great places to visit and, well, heck, as long as you're there you may as well see what's on the scanner! Niagara Falls is no exception. (Unless you're on your own honeymoon, of course!) John Corby says most of the radio traffic is on the Canadian side of the falls, and here's how to tune it in.

Become a Frequency Detective 18

By Chuck Gysi

No matter how large or small your local public safety communication system, it's a good bet there are some surprise frequencies waiting to be found by the monitor who is willing to look outside the routine channels. Here's how to do some investigating of your own, plus some examples of the kind of unusual frequencies or nonstandard uses you may uncover.

Crisis on the Korean Peninsula 21

By Larry Van Horn

At presstime, tension continues to build between North Korea and the world community. A list of broadcast and utility frequencies has been complied by Larry and Gayle Van Horn to help hobbyists and concerned citizens monitor news and opinion from that part of the world.

Confessions of an On-line Baseball Listener 22

By Ken Reitz

Say it isn't so! For years Ken Reitz has written about radio or satellite set-ups, flag stations, and radio affiliates for following your favorite baseball team. For the first time, he has succumbed to the temptation of internet radio. ... Well, there's some of that information for listening the old-fashioned way, too.

In addition to routine dispatch channels used by firefighters, additional frequencies may be used exclusively on the fireground or for practice drills. Make sure you check all frequencies licensed to your local fire department. Read more about discrete frequencies on page 18. Photo by Chuck Gysi, N2DUP/scancomm.net

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Address:	7540 Highway 64 West, Brasstown, NC 28902-0098
Telephone:	(828) 837-9200
Fax:	(828) 837-2216 (24 hours)
Internet Address:	*www.grove-ent.com* or e-mail: *mt@grove-ent.com*
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Owners
Bob and Judy Grove
judy@grove-ent.com

Publisher
Bob Grove, W8JHD
bobgrove@monitoringtimes.com

Managing Editor
Rachel Baughn, KE4OPD
editor@monitoringtimes.com

Assistant Editor
Larry Van Horn, N5FPW

Art Director
Bill Grove

Advertising Svcs.
Beth Leinbach
(828) 389-4007
beth@grove-ent.com

Reviews:

The sheer number of features, services, and modes accessible to the **Uniden BC785D** tabletop scanner make it the "scanner enthusiast's scanner," according to Bob Parnass (p.78).

Ten-Tec's deceptively unassuming **RX-320** shortwave receiver in a black box is "an excellent radio at a great price," says reviewer Lee Reynolds (p.82). When combined with your computer and a number of **third-party software** packages, it effectively turns it into a number of radios, according to your preference (p.84).

Midland's WR-30 is simple, well-designed, easy to program, and it works well; what more could you ask of a weather radio? (p.86)

John Catalano found a number of useful, radio-related computer programs at dxsoft.com, particularly the decoding software **SeaTTY** (p.80). Decode RTTY, NAVTEX and more using this simple program or its big brother, **TrueTTY**.

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Monitoring and the Law

Jorge Rodriguez
jorgerodriguez@monitoringtimes.com

New York Monitoring Laws

In these times of heightened awareness about terrorism it seems appropriate to begin our specific coverage of monitoring laws in America with New York. Certainly the events of September 11th have increased the amount of public safety radio traffic there and, with that, an accompanying interest to monitor those transmissions.

New York's regulation of police scanners is found primarily in section 397 of the New York State Vehicle and Traffic Laws. In two hundred and four words it prohibits the equipping of a motor vehicle with a radio that can receive radio signals used by the police. It also prohibits you from using a motor vehicle that is so equipped. Interfering with police radio transmissions is also prohibited.

Since it was enacted, several cases have interpreted what the New York lawmakers intended. In 1978, in a case titled *People v. McGee,* the law was found to be constitutional and not preempting federal law by Congress. The preemption issue does not seem to have been revisited by other cases since then nor since the passage of PR 91-36 (FCC 93-410) as it relates to licensed amateur radio operators, a group often excluded from such radio laws.

For the past ten years, PR 91-36 has held that "… state and local laws that preclude the possession in vehicles or elsewhere of amateur radio service transceivers by amateur operators merely on the basis that the transceivers are capable of the reception of public safety, special emergency, or other radio service frequencies, the reception of which is not prohibited by federal law, are inconsistent with the federal objectives of facilitating and promoting the amateur radio service and, more fundamentally, with the federal interest in amateur operator's being able to transmit and receive on authorized amateur service frequencies. We therefore hold that such state and local laws are preempted by federal law."

The McGee case also explains that the government interest in such a law is in preventing criminals from monitoring police broadcasts in their automobiles, before, during and after the commission of a crime. Such a law is therefore a reasonable restriction on liberty. However, the restriction applies even if the radio is not turned on, which could mean that merely having such a radio anywhere in a vehicle violates the law.

Four years before McGee, in the case of *People v. Verdino*, section 397 was applied to prohibit a radio that was unplugged and thus not working. The court decided it was still "capable" of receiving signals and was illegal.

❖ Secondary, Criminal and Regional Law

Besides primary sources of law, such as statutory law made by lawmakers and case law made by judges, there are many secondary sources of law. One such secondary source is the published opinion of a state's attorney general. Attorney General Opinions are issued in response to requests by state agency officials and local government attorneys to help answer unsettled questions of law. In 1975 and 1976, New York's then Attorney General Dennis C. Vacco issued two important opinions related to police scanners.

The first of these, Op.Atty.Gen 311 (1975), concluded that permits for police scanners could be issued by a designated person in counties with a county police department which are established by a county charter. The other Opinion of Attorney General Vacco's office, Op.Atty.Gen 255 (1976) addressed confiscated police scanners from those who violated the New York law. The Opinion stated that since the radio was not contraband (something inherently illegal) it must be returned to the individual even if that person is convicted of breaking the law.

In addition to section 397's prohibitions, New York's criminal law has a statute that also covers the illegal use of police scanners. Section 40 of Article 140 of the consolidated laws of New York prohibits possession of a police scanner while committing a criminal offense.

The City of Rochester, New York, has its own city ordinance banning the use of police and fire scanners, too. Rochester defines such radios broadly as "a radio receiver set of such size as to be easily and conveniently carried by hand or in a vehicle from one (1) location to another, regardless of the type of power supply, and which can be quickly used while being carried by a person either on foot or in a vehicle." Rochester makes no exception for licensed amateur radio operators. After broadly defining what they consider to be portable scanners, they do exclude peace officers, authorized technicians of the Police and Fire Departments, or persons holding a permit from the Rochester Chief of Police.

In summary, in New York you can't have a police scanner in a vehicle even if the radio is not connected or turned on. Possession of a police scanner while committing a crime is also illegal. And within the city limits of Rochester, using a portable, hand held or easily hand carried radio to receive police and fire frequencies is prohibited.

Do you have personal knowledge of these laws in New York or in other states? Have questions of interpretation? Other monitors would like to know: write me c/o *Monitoring Times* or via email at the above address.

Disclaimer: Material in this column is for news and informational value and nothing here should be construed as legal advice. Persons wishing specific legal advice should consult a licensed attorney in their jurisdiction.

SECTION 397 NEW YORK STATE VEHICLE AND TRAFFIC LAWS
EQUIPPING MOTOR VEHICLES WITH RADIO RECEIVING SETS CAPABLE OF RECEIVING SIGNALS ON THE FREQUENCIES ALLOCATED FOR POLICE USE.
A person, not a police officer or peace officer, acting pursuant to his special duties, who equips a motor vehicle with a radio receiving set capable of receiving signals on the frequencies allocated for police use or knowingly uses a motor vehicle so equipped or who in any way knowingly interferes with the transmission of radio messages by the police without having first secured a permit to do so from the person authorized to issue such a permit by the local governing body or board of the city, town or village in which such person resides, or where such person resides outside of a city, or village in a county having a county police department by the board of supervisors of such county, is guilty of a misdemeanor, punishable by a fine not exceeding one thousand dollars, or imprisonment not exceeding six months, or both. Nothing [contained] in this section … shall be construed to apply to any person who holds a valid amateur radio operator's license issued by the federal communications commission and who operates a duly licensed portable mobile transmitter and in connection therewith a receiver or receiving set on frequencies exclusively allocated by the federal communications commission to duly licensed radio amateurs.

CHAPTER 40 OF THE CONSOLIDATED LAWS OF NEW YORK
PENAL LAW
Article 140. Burglary and related offenses
§140.40. Unlawful possession of radio devices.

As used in this section, the term "radio device" means any device capable of receiving a wireless voice transmission on any frequency allocated for police use, or any device capable of transmitting and receiving a wireless voice transmission.

A person is guilty of unlawful possession of a radio device when he possesses a radio device with the intent to use that device in the commission of robbery, burglary, larceny, gambling or a violation of any provision of article two hundred twenty of the penal law.

Unlawful possession of a radio device is a class B misdemeanor.

CODE OF THE CITY OF ROCHESTER, NEW YORK, v66 Updated 10-1-2002
PART II GENERAL ORDINANCES
Chapter 44, CONDUCT — MISCELLANEOUS
§ 44-2. Radio receiving sets.
A. No person shall use a portable receiver for the purpose of receiving signals on police or fire frequencies.
B. No person shall equip any motor vehicle with a radio receiving set capable of receiving signals on the frequencies allocated for police or fire use or knowingly use a motor vehicle so equipped or knowingly in any way interfere with the reception or transmission of radio messages by the Police or Fire Department. [Amended 1-27-1970, Ord. 70-36]
C. The Chief of Police is hereby authorized to issue, regulate or revoke permits for the use of such receiving sets to persons or corporations engaged in official business. [Amended 1-27-1970, Ord. 70-36; 5-28-1974, Ord. 74-180]
D. The provisions of this section shall not apply to peace officers, authorized technicians of the Police and Fire Departments or persons holding a permit from the Chief of Police. [Amended 1-27-1970, Ord. 70-36; 5-2

GRUNDIG SHORTWAVE

Leaders in Their Class

"Outstanding Performance...
Unbeatable Audio Quality...
Unbeatable Price..."

Lawrence Magne.-Editor in Chief, Passport to World Band Radio.

SIGNAL STRENGTH
SATELLIT 800
MILLENNIUM
GRUNDIG
TUNING
BATT AGC
AM SYNC
MEMORY
70
SW
15410

Satellit 800

The LCD Big! Bold! Brightly Illuminated 6" by 3½".
Liquid Crystal Display shows all important data: Frequency, Meter band, Memory position, Time, LSB/USB, Synchronous Detector and more.
The Signal Strength Meter Elegant in its traditional Analog design, like the gauges in the world's finest sports cars. Large. Well Lit. Easy to read.
The Frequency Coverage Longwave, AM and shortwave: continuous 100-30,000 KHz. FM: 87-108 MHz VHF Aircraft Band: 118-137 MHz.
The Tuning Controls

- For the traditionalist: a smooth, precise tuning knob, produces no audio muting during use. Ultra fine-tuning of 50Hz on LSB/USB, 100Hz in SW, AM and Aircraft Band and 20 KHz in FM.
- For Fixed-step Tuning: Big, responsive Up/Down tuning buttons.
- For direct frequency entry: a responsive, intuitive numeric keypad.

The Operational Controls Knobs where you want them; Buttons where they make sense. The best combination of traditional and high-tech controls.
The Sound Legendary Grundig Audio Fidelity with separate bass and treble controls, big sound from its powerful speaker and FM-stereo with the included high quality headphones.
The Many Features 70 user-programmable memories, Two 24 hour format clocks, Two ON/OFF sleep timers, Massive, built-in telescopic antenna, Connectors for external antennas – SW, AM, FM and VHF Aircraft Band, Line-out, headphone and external speaker jacks.

Size: 20.5" L x 9" H x 8" W **Weight:** 14.50 lbs.

GRUNDIG
YB 300PE
9:21
24 STATION MEMORIES

Yacht Boy 300PE AM/FM/SW Radio

Power and Performance with Affordability

Designed for the traveller, the titanium look digital AM/FM/SW radio provides incredible power and performance for an incredibly low price! Packed with features, including 3 AA batteries, AC adapter, earphones, supplementary Antenna and carrying case!

State of-the-art features include:
Digital tuning with 24 user-programmable memory presets, 13 SW Bands (2.30-7.80 MHz; 9.10-26.10 MHz), Illuminated multi-function LCD display screen, AM/FM stereo via earphones, Clock, alarm and 10 to 90 minute sleep timer, Digital tuning display, Direct frequency entry, DX/ local selector, Titanium look finish, External antenna jack, Dynamic micro speaker, Earphone jack, Telescopic antenna.

Size: 5.75" L x 3.5" H x 1.25" W **Weight:** 9.92 oz.

GRUNDIG
YB 400PE
7:00
9.05
40 STATION MEMORIES
SSB
LW/MW/SW/FM STEREO·PLL SYNTHESIZED DUAL CONVERSION

Yacht Boy 400PE AM/FM/SW Radio

Most powerful and compact portable

The Big Breakthrough! Power, performance, and design have reached new heights! The Grundig 400 Professional Edition with its sleek titanium look is packed with features like no other compact radio in the world. **Pinpoint Accuracy!** The Grundig 400PE does it all: pulls in AM, FM, FM-Stereo, every shortwave band (even aviation and ship-to-shore)-all with lock-on digital precision. **Ultimate Features!** Auto tuning! The Grundig 400PE has auto tuning on shortwave that stops at every signal and lets you listen. With the exceptional sensitivity of the 400PE, you can use the auto tune to catch even the weakest of signals. Incredible timing features! The Grundig 400PE can send you to sleep listening to your favorite music. You can set the alarm to wake up to music or the morning traffic report, then switch to BBC shortwave for the world news. The choice is yours! **Powerful Memory!** Described as a smart radio with 40 memory positions, the Grundig 400PE remembers your favorites-even if you don't!

Size: 7.75" L x 4.5" H x 1.5" W **Weight:** 1 lb. 5 oz.

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for the traveler in you!

Lextronix / Grundig, P.O. Box 2307, Menlo Park, CA 94026 • Tel: 650-361-1611 • Fax: 650-361-1724
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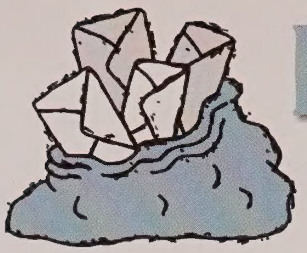

LETTERS TO THE EDITOR

Volunteer Monitors Needed: Two New Projects

"My article on wildlife radio-tracking in December 2002 *Monitoring Times* attracted lots of interest from scanner fans, ham operators, and wildlife researchers. Now two more monitoring projects are beginning, with a need for volunteers in south-central and southeastern states.

"A biologist at University of South Florida at Tampa (USF) is studying Florida Burrowing Owls. They are a slightly different subspecies from the Western Burrowing Owls that we have previously monitored for researchers based in Saskatchewan and Washington. It is thought that their range is limited to Florida and the Keys, but there is one 40-year-old report of a sighting in North Carolina. Researchers have banded the legs of these birds in the past, but none of the banded owls have been recovered after leaving their Florida homes.

"For this study, some Florida Burrowing Owl chicks are being radio-tagged in late April and early May. Local researchers are tracking them as they leave their nests, learning to forage. Between July and September, the young owls are expected to take off for parts unknown. USF wants volunteers to listen for the VHF radio tags in an attempt to determine their routes and final destinations.

"For about a month beginning in mid-June, Bat Conservation International wants volunteers to join a team that will track the movements of Mexican Long-nosed Bats in and around Big Bend National Park in Texas. Physically fit hikers are especially wanted, but a few vehicle-based monitors will also be helpful, and there may be opportunities for some home monitors.

The well-equipped radio shack of MT contributor Sterling Marcher, La Mirada, Calif.

"My 'Homing In' Web site **http://www.homingin.com** carries the latest details, frequencies, and contact information for both of these projects. Thanks in advance for your help!"

– Joe Moell K0OV, Fullerton, CA,
k0ov@homingin.com

See this month's *Antenna Topics* for an article on how radio direction finding antennas work! - *rb*

Notification Networks

Garry W. Watts, President of the Fire Notification Network of Michigan, wrote to point out there are a great many more incident notification groups than were listed in the March feature article by Michael Coppola. Garry adds a list of the larger groups below, but an excellent list (and their websites) can also be found at **http://www.firehouse.com/links/Communications/Paging_Groups/**

Garry's list is in the table to the left.

America's Fire Paging Notification Networks

Emergency Action Network (EAN	New Jersey
Metro Notification Service (MNS)	New York
TAC9 Paging	New England
PPS Fire Network (PPS)	New Jersey
Central Illinois Firenet (CIFN)	Illinois
Carolinas Firepage (CFP)	North & South Carolina
DC Firecom (DC)	District of Columbia
Firenet Chicago (CHGO)	Illinois
Columbia Firenet (CFN)	Missouri
Eastern Shore Fire Network (ESFN)	Delaware & Maryland
St. Louis Fire Net (STLFN)	Missouri
Fire Notification Network of Michigan (FNNM)	Michigan & Windsor, Ontario
Firepage (r)	California
Mountain News Net (MNN)	Colorado
Firepage of Tampa Bay (TPA)	Florida
ALERT FS (formerly GCFN)	Florida
Firepage Ohio (FPO)	Ohio
New Orleans LA Fire Paging (NOLA)	Louisiana
Virginia Fire Notification Net (VFN)	Virginia
Hartford Citywide Paging (CWP)	Connecticut
Hot News Alert Network (HNAN)	Georgia
Incident Command Page (ICP)	Arizona
Twin Citywide Fire Notification Net (TCFN)	Twin Cities
Maryland Firenet (MFN)	Maryland
Milwaukee Firenet (M)	Wisconsin
New England Fire & News Network (NEFFN	New England
East Coast Paging & Wireless (ECPS)	New England
Toronto Firenet	Greater Toronto

Internet Radio Linking Project

"There are now over 2000 World-wide Ham radio Repeater and Simplex Internet Voice Gateways.

"Please remind radio hams to take their handhelds with them when traveling abroad as many cities around the world now have their VHF and UHF repeaters and some VHF/UHF simplex radio channels linked to Internet Voice Gateways.

"This makes it possible for hams to keep in touch with ham friends in other cities by using the local Internet Voice Gateway in the city they are visiting. Internet Voice Gateways on repeaters or simplex channels also come in useful when there is no HF propagation so friends can keep in touch across the world. Other uses might be setting up QRP contacts, HF skeds, SSTV, etc. I have used them to give talks to radio cubs in different countries and clubs around the U.K.

"There are three separate linking systems: Irlp, Echolink, and eQSO.

"For a list of cities and countries where the links are available and for further information, please email me or visit my web site. I usually monitor G4NJI node 5200 simplex

145.2875MHz and GB3DV node 5130 repeater 433.025MHz.

– Ian Abel G3ZHI, Yorkshire, UK

http://www.qsl.net/g3zhi - many ham radio links
United Kingdom Internet Radio Linking Project:
http://www.ukirlp.co.uk (recently updated)
http://www.irlp.co.uk
http://www.irlp.net

MT Goes to the Gulf

"I am an airman currently deployed to Oman in support of Operation Enduring Freedom and have brought a couple of my shortwave radios with me. One radio is a VR-500 and the other is a Coby CX-CB12. I have been pleased with the stations I have been able to log so far. I have hit numerous weaker stations but have not been able to pull them in.

"While on my way here my *2002 Passport to Radio* and external antenna were ruined as I did not pack them as well as I thought I did. So, when my wife forwards me my copy of *Monitoring Times* I am a happy camper.

"Thanks for a great publication,"

– Bill Kosla

More on Adjacent Channels

"I'm a longtime subscriber of your fine magazine, and have a lot of respect for the folks who write for the mag... Bob Grove's reply in the Jan 2003 issue to *Ask Bob*, on Ron Lindow's question about adjacent TV channels being assigned in the same geography caught my attention, so I did a little (not a lot) of research." [*See another follow-up by Joseph Martin in March column-ed.*]

"There are at least several cases where channels 4 and 5 are used in the same city: St Louis; Kansas City; New York City; Washington, DC; Salt Lake City; San Francisco, Oklahoma City; Boston, Ft Worth-Dallas; Chicago. The channel 4/5 split has a couple of megahertz between it, unlike all of the other channel splits except for channels 6/7.

"In addition, there are several cases of channels 6 & 7 used in the same city, and others where the 2 channels are used in close proximity: Miami, Birmingham, Little Rock, Boise, Philadelphia-New York.

"Thanks again for the great services you provide the scanning hobby."

– Tom Hirsch

More on Channel 1

The following email was received from a Canadian amateur regarding the effort to designate FRS/GMRS Channel 1 a universal calling channel (see April *Closing Comments*); Sean submitted an article on the topic to newspapers in his county to help spread the movement in Canada. He also provided background links and resources for the newspapers to research further, such as **http://www.f-r-s.org**

"Midland Radio Manufacturing as well as several ARES and REACT units in North America (with the encouragement of several radio hobby magazines such as *Popular Communications* and *Monitoring Times*) are backing a move to make FRS and CB channel one an international 'goodwill' frequency. With 'homeland security' on everyone's mind, the emphasis on an alternate mode of communication where someone might be listening, should be made.

"As fellow radio enthusiasts, I think this would be another excellent opportunity to put our hobby into the radio spotlight. As hams, SWLs and scannists, I feel that we should make an effort to monitor these two frequencies as part of broadening our radio horizons. A good experience on FRS or CB may encourage an individual to pursue Amateur Radio.

"Your comments and your effort spread the word about monitoring of FRS Channel One as well as CB Channel One would be greatly appreciated."

– Sean Welsh, VE3OZ

Why not write a letter to the editor of your local paper, too?

We welcome your ideas, opinions, corrections, and additions in this column. Please mail to ***Letters to the Editor,*** 7540 Highway 64 West, Brasstown, NC 28902, or email *editor@monitoringtimes.com.* Letters may be edited for length and clarity.
Happy monitoring!

-Rachel Baughn, KE4OPD, editor

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Volunteers for Homeland Security

As Secretary Tom Ridge and Atty. Gen. John Ashcroft urge Americans to take personal responsibility for homeland defense, people are exploring ways in which their skills can be put to good use in the effort. One group is taking on the task by going back to its roots. With the motto of "eyes of the home skies," the Civil Air Patrol searched US coastlines for enemy submarines during WWII, before assuming its current role in search-and-rescue missions. Brig. Gen Dave Cleary said today's patrol volunteers can help protect the US by patrolling waterways and coastlines and vulnerable spots such as nuclear power plants.

Another group available to mobilize in the case of local or national emergency is the amateur radio community. The Department of Homeland Security encourages cities to use ham operators for support. In an AP story for the *Dallas Morning News*, Pat McCracken, Irving, TX, emergency management coordinator said, "On the surface, they may not seem important, but in my business they're critical. I'd never go into an emergency without them."

NCS Becomes Part of Homeland Security Department

At a March 5 ceremony, the National Communications System (NCS), responsible for ensuring the availability of national security and emergency preparedness communications, formally joined the Department of Homeland Security. NCS had been affiliated with the Department of Defense for 40 years.

Established in 1963 after the Cuban Missile Crisis, NCS responsibilities include the Government Telecommunications System, and the Telecommunications Service Priority Program. It is currently working with U.S. wireless carriers to deploy a Wireless Priority Service, expected to be available across the country by the end of the year. The service provides priority access to wireless networks for key government, military, police, fire and other emergency response personnel. (American Forces News)

Theater Frequency Management

Along with the thousands of planes filling the sky over Iraq are more than 5,000 different electronic frequencies used for critical communications between the systems and people who make those flights possible.

With numbers like these, there are plenty of chances for something to become a problem. Keeping those systems and people from "stepping on" each other's frequencies is Master Sgt. John C. Zimmermann, the theater frequency manager for the Combined Forces Air Component commander.

"Frequency management is a process to ensure all equipment emitting radio frequency energy work harmoniously within the electromagnetic battlespace," said Zimmermann, speaking from the Combined Air Operations Center at a desert air base in Southwest Asia. "For instance, each of the satellites we use has their own frequencies. Each of the various radars operate in different bands and within those bands they're assigned their own frequencies."

"So to give you an example," Zimmermann said, "I'm trying to make sure the satellite we're using to control (an unmanned aerial vehicle) with isn't going to interfere with the (Navy fighter pilot) the (airborne warning and control system) crews are talking to."

Zimmermann is deployed from Ramstein Air Base, Germany, where he is the noncommissioned officer in charge of the U.S. Air Forces in Europe frequency management office. His current job deals with juggling electronic frequencies for everything from handheld radios to the big satellite links that bring in the military computer network connections in an area that spans from Turkey to Afghanistan.

When assigning frequencies, Zimmermann analyzes a user's request, reviews the requirements, and then looks at frequencies that have already been issued or assigned to other users. He tries to find an unused frequency or one being used in a geographically separated area.

Finding the right frequency is not necessarily an easy task. For Operation Iraqi Freedom alone there are about 21,000 individual frequencies assigned, Zimmermann said. Complicating the task further, the electromagnetic spectrum is actually a sovereign resource and each country manages it the way they deem fit.

"When we deploy to places like Southwest Asia we have to coordinate all the frequencies we use with the host nation. This is to ensure something we use is not going to interfere with a frequency the host nation may be using for cell phones. And that's actually a case that happened over here," Zimmerman said.

Each component has its own frequency manager and Zimmermann said he is in contact with them daily. Conflicts between frequencies used by the various components are very rare because of the coordination process and the different kinds of equipment used. If a conflict does pop up, the component frequency managers usually solve it among themselves, Zimmermann said.If the managers cannot resolve the conflict, the problem is forwarded to U.S. Central Command to decide which mission has the priority.

"Without any frequency management we'd have something we call 'frequency fratricide,'" said Zimmermann. "Everyone would be 'stepping on' each other. There needs to be a clear, relatively clean signal between two links and if someone nearby is using the same frequency for another communication link, there would be frequency fratricide."

"If it's not done right we'll hear about it. This is one of those jobs that isn't usually noticed until there's a problem," Zimmermann said. "The operators don't care what frequencies they're using. They just want to be able to key their microphone and have someone respond to them from the other side every time. They don't care how it happens, they don't care if it takes five days to find a frequency that doesn't interfere, they just need to know what it's going to be and that it works." (AFPN)

The Shuttle Blackout Myth

When Mission Control lost communications with Space Shuttle *Columbia* during reentry on February 1st, it wasn't a routine occurrence and that's why flight controllers knew something was horribly wrong. In fact, loss of signal (LOS) during the reentry phase hasn't been routine since 1988.

Prior to this time, it was common for Mission Control to lose contact with the space shuttle orbiter as it entered the Earth's atmosphere. The heat build-up around the vehicle creates a layer of ionized particles which are impervious to radio signals. Communications from the ground couldn't penetrate to the orbiter and transmissions from the shuttle couldn't reach the ground. A blackout of communications occurred which lasted about four

BULLETIN BOARD

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Hall of Science ARC Hamfest at the New York Hall of Science parking lot (Flushing Meadow Corona Park, 47-01 111st St), 9a.m., $5 donation; talk-in 444.200 PL 136.5, 146.52 simplex. VE exams 10a.m. (info LMenna6568@aol.com). Free parking, door prizes, food. For more info http://www.qsl.net/hosarc or call Stephen Greenbaum (night) 718-898-5599, wb2kdg@arrl.net.

June 8: Bethpage, NY
Long Island Mobile Amateur Radio Club hamfest at Briarcliffe College (1055 Stewart Avenue) 9a.m.-1p.m. Talk-In Freq: 146.850 136.5 PL; Admission: $6. No exams being given. For information, Brian Gelber, WB2YMC, 516-822-0673 or email hamfest@limarc.org or visit http://www.limarc.org

June 13-15: Blackfalds, Alberta, Canada
Central Alberta Radio League (CARL) 33rd Amateur Radio Picnic and Hamfest at Burbank Campground (reservations: 403-885-5335), check-in freq 147.150 (+600MHz), 146.52 simplex. Registration fees: Family weekend pass $25, camping $10 per night per unit, day pass $6 per ham or $12 per family; Saturday supper $8 adults, $3 kids under 12. For more information contact Bob King president@carlclub.ca 403-782-3438 or Darren Misik webmaster@carlclub.ca 403-347-4164 .

June 21: Piscataway, NJ
Raritan Valley Radio Club hamfest at High School near intersection of Old New Brunswick and Behmer Roads, 7am-2pm; $5 admission; talk-in 146.025/625, 447.250/442.250, PL 141.3, 146.520 simplex. Official DXCC and WAS verification. Contact Marty Ficke, KD2OK@aol.com 732-968-6911 or visit www.w2qw.org

June 27-29: South Portland, ME
40th International Radio Club of America convention at the Best Western Merry Manor Inn (700 Main Street, South Portland, Maine: 207-774-6151, http://www.seenewengland.com/merrymanor). Registration $35, payable to Mike Sanburn, KG6LJU (mikesanburn@hotmail.com or P.O. Box 1256, Bellflower CA 90707-1256). Station tours, prize drawings, banquet, auction (http://www.ircaonline.org) Radio club "Decalcomania" also welcomed http://www.anarc.org/decal/)

minutes as the craft passed through the atmosphere between 400,000 and 200,000 feet. This phenomenon goes all the way back to the Mercury, Gemini and Apollo missions.

But those were the old days. In 1983, the problem of lost communications was solved when NASA began launching its fleet of Tracking and Data Relay Satellites (TDRS). By using one of the shuttle's four S-band antennas mounted on the top of the orbiter, signals can now be sent up to a TDRS satellite and then from the satellite to the ground. This method avoids altogether the hot plasma layer on the belly of the shuttle that absorbs radio waves. With no loss of signal, the shuttle blackout period is just a long-held myth, one which most people, even long-time NASA fans, don't know about.

If there's any solace to be taken by the investigators trying to determine what happened that day, it's this: data was available right up until *Columbia's* break up. (Laura Quarantiello)

Enhanced SSB "Extremely Inconsiderate"

The FCC has sent advisory notices to four enthusiasts of what's become known as "enhanced SSB" (also known as "upper wideband" and "lower wideband") – the practice of engineering transmitted single-sideband audio to approach broadcast quality.

Occupying more bandwidth than necessary in a heavily used amateur band, Hollingsworth wrote, not only could generate ill will among operators but lead to petitions asking the FCC to establish bandwidth limits for amateur emissions. At present, the FCC imposes no specific bandwidth limits on various amateur modes.

Hollingsworth cited §97.307(a) of the Amateur Service rules that requires the signal of an amateur station not occupy "more bandwidth than necessary for the information rate and emission type being transmitted, in accordance with good amateur practice."

"The Amateur Service is not a substitute for the Broadcast Service," Hollingsworth said, "and the frequencies allocated to the Amateur Service were not allocated for a 'broadcast quality' audio emission or sound." (ARRL)

British Consider Changes in CB

The Radiocommunications Agency (RA) is the federal agency in Great Britain that is responsible for regulating telecommunications. On March 25th, the UK proposed to eliminate 40 of their 80 Citizens' Band (CB) channels. Comments on the proposal close on June 18, 2003.

At its peak, there were 300,000 CB licenses in Great Britain. Today, however, use of the CB radio frequencies has declined to under 24,000 and retention of all 80 channels is no longer justified. Forty of the eighty CB channels are UK-specific channels which begin at 27.60125 MHz and are spaced every 10 kHz to 27.99125 ...just below the amateur ten meter band. The other 40 are so-called "Pan-European channels," which begin at 26.965 and extend to 27.405 MHz ...the same as in the U.S.

When the 40 UK-only channels are removed, some CB users will have to obtain new equipment. To prevent a major inconvenience, the RA is giving seven years' notice of the closure ...now scheduled for June 30, 2010. "Monitoring has shown that many channels remain unused for most of the time, and indicate that congestion would not occur even if only 40 channels were available."

In the UK, all CB operators must be licensed, and an annual license currently costs £15 (about $24). A Communications Bill now before Parliament would eliminate individual CB licensing effective July 1, 2004. The technical and operating rules will continue to apply and will be enforced following deregulation.

"If these proposals are implemented, from July 2004 the CB radio service will be license-exempt (no annual license fee), initially with 80 channels and, from 2010, with 40 channels," the RA said. (Fred Maia, W5YI)

Prank Maydays No Laughing Matter

False mayday calls have always been a major headache for search and rescue teams, needlessly endangering rescue personnel, potentially interfering with real emergencies, and wasting money. Though states have raised the penalty for false reports, the stakes just got higher. Following 9/11, says Capt. Alan Hugenot in his column in *The Log,* "It is now a felony, punishable by six years in prison and a $250,000 fine, for anyone to make a false mayday radio transmission, for whatever reason, and ignorance of the law is no excuse."

Capt. Hugenot pointed out, however, that since the FCC stopped enforcing the requirement to register a ship radio licence and to obtain a marine-radio operator licence, some folks are so ignorant of radio operation they think you have to call "mayday" to get on the air!

George Hauber of Middletown, NJ is one who will experience the new law firsthand. He admitted to making more than 10 phony distress calls last summer. He will be sentenced in federal court June 23.

Maritime Safety

In February the National Weather Service installed the first transmitter on the East Coast that transmits weather exclusively to mariners. The 300-watt signal of WNG-574 is based at Eastern Point Light in Glouchester, MA, transmitting on 162.425 MHz, says *MT* Contributor Bob Fraser. The service provides more weather information more often – crucial to safety of fisherman, especially with reduced crews.

The National Distress and Response System is being modernized. The Coast Guard awarded a $611 million contract in September to General Dynamics in Scottsdale, AZ, to completely revamp the system. Called Rescue 21, it will be the nation's primary maritime 911 system for coastal waters of the US and it's territories. Rescue 21 will begin deployment in the northeast regions and is scheduled for completion in all regions by September 2006.

"Communications" is compiled by Rachel Baughn from news articles submitted by our readers. Many thanks to this month's star reporters: Anonymous, Albany, NY; Gerald Brookman, Kenai, AK; Robin Hartford, Newburyport, MA; Norman Hill, Arlington, VA; Sterling Marcher, La Mirada, CA; Doug Robertson, Oxnard, CA; Brian Rogers, Allen Park, MI; Richard Sklar, Seattle, WA; Robert Thomas, Bridgeport, CT; and via email, Bryan Breczinski, Mark Cobbledick, Bill Grant, Fred Maia W5YI, Ed Muro, Jerry None, Jack Painter via WUN, Laura Quarantiello, K Russ, Matthew Stanley, Larry Van Horn, Robert Wyman, Rich Magdy via Bob Zanotti.

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Northeast Tanker Task Force

A vital player over the Atlantic Ocean

By Kevin Burke

All photographs by Kevin Burk

Military communications may not operate on a schedule like broadcasters do, but their frequencies are a favorite target for listening because the armed forces are in constant training. The war in Iraq, however, has given special excitement to this hobby, because of the increased level of activity and knowing that this time it's not a drill.

Prior to the Base Realignment Closings in 1990, there was a Tanker Task Force (TTF) at what was then called Pease Air Force Base in New Hampshire. As a result of the Air Force Base being closed, the duties of the Tanker Task Force were transferred to Plattsburg Air Force Base in upstate New York. Then, Plattsburg became a victim of the second round of Base Realignment Closings, leaving the Task Force without a home.

In 1995 the Northeast Tanker Task Force was created, equally divided between the Air National Guard units flying KC-135's from New Hampshire and Maine. The commander of the Task Force is Lt Col Jim Ogonowski.

The Northeast Tanker Task Force is comprised of the 157th Air Refueling Wing of the New Hampshire Air National Guard, at Pease International Tradeport, and the 101st Air Refueling Wing of the Maine Air National Guard, at Bangor International Airport, under command of the Tanker Airlift Control Center, part of Air Mobility Command at Scott Air Force Base in Illinois.

The Northeast Tanker Task Force's KC-135's can refuel Air Force cargo, bomber, and fighter aircraft. With the attachment of a 150 pound hose and basket assembly, the tankers can also refuel Navy and Marine aircraft. The tankers also have a cargo area above the internal fuel cells that allow tankers to carry both cargo and passengers as well.

Large cargo aircraft like the C-5 or C-17 are capable of holding enough fuel to cross the Atlantic Ocean, but with the help of midair refueling, a cargo plane could take off with minimum fuel and maximum cargo, and receive the necessary fuel once airborne. Bomber aircraft coming across part of the US and heading overseas could utilize the task force to get enough fuel while in the air to complete their mission, come back across the Atlantic, get fuel again, and continue across part of the US to their home base.

Full Service Station

Fighter aircraft have a shorter range and must depend on the Northeast Tanker Task Force to cross the Atlantic. They not only rely on the TTF for fuel, but also for navigation and radio communication. The VHF and UHF radios in fighter aircraft are only capable of communicating a few hundred miles. The KC-135's have High Frequency radios and can communicate over much longer distances. The KC-135's can also navigate for the fighters and in an emergency can direct fighters to a divert base.

The location of both Pease and Bangor is a major factor in what makes the Task Force so valuable. All military aircraft heading over the Atlantic fly the shortest possible route, which takes them over New England. Pease and Bangor are the closest two US tanker bases to the long crossing over the Atlantic Ocean.

When fighter aircraft need to make this crossing they contact the Tanker Airlift Control Center, part of Air Mobility Command at Scott Air Force Base in Illinois. TACC then notifies the Northeast Tanker Task Force. The Task Force then arranges a flight plan that puts the fighters at their destination during daylight hours. This is very important to fighter pilots who have been flying many hours, sometimes 8 to 10 hours

straight, including as many as 9 mid air refueling connections with a tanker. The flight plan for the tanker is customized to meet the fighters along their route and escort them across the Atlantic.

The task force also creates a multiple contingency plan for the fighters in case of an emergency.

It is standard practice to keep the fighters more than 3/4 full of fuel as they cross the Atlantic. This requires more refueling connections with the tanker but it also maintains maximum fuel onboard the fighter should a problem arise. For each scheduled refueling point, the Task Force has assembled a list of potential divert bases. If a problem arises and a fighter can not take on fuel or must land as soon as possible for a mechanical reason, the tanker can give the fighter the distance and heading information to any of the divert bases, and with its long range radio can coordinate any assistance the fighter may need.

Currently the Task Force at Pease is operating 24 hours a day, flying 12 to 14 sorties per day with 17 crews on alert, 9 from various other bases around the country.

Flying a Coronet Mission

I was invited to fly with the New Hampshire Air National Guard in March to get an inside look at an actual Coronet Mission. The Task Force has been escorting fighter aircraft overseas on an almost non stop basis, in preparation for the impending invasion of Iraq.

For this early morning flight, I need to report to Pease at 2:30 am. The crew of the tanker, consisting of a pilot, co-pilot, and boom operator is also reporting to Pease at this time. I have been told our takeoff time is scheduled for 6:00. Prior to our arrival, the staff of the Tanker Task Force has been checking the weather along our flight plan and at the divert bases.

After about an hour on base I get briefed on being a passenger on a KC-135. It's a little more intensive that the commercial airline demonstration before each flight, but it has to be. There are emergency procedures, and standard procedures, such as carrying around an emergency oxygen packet, that must be adhered to.

Next is a mission briefing in which the whole plan is laid out, even the role of tankers from another base is explained. It is here I learn that I will be on one of two tankers departing from Pease. Our plan is to bring 12 A-10 Warthogs half of the way across the Atlantic, to an airbase in the islands called the Azores. The flight for us will be 5-1/2 hours. There will be two tankers departing from the Azores just after we take off. They will meet us at a predetermined location and take the A-10's the rest of the way to the Azores and land after all A-10's have landed.

We will take off immediately after being notified that all of the A-10's are airborne and head to Nantucket island off of Cape Cod to meet the Warthogs. Six will be from the Massachusetts Air National Guard, and six will be from the Connecticut Air National Guard. The tanker I am going to be on will take one group and the tanker from Pease will take the other. Each flight of six A-10's actually takes off as a flight of eight: two jets are spares in case of mechanical problems with any of the planned 6 jets. If all goes well with the first six jets at the first refueling, the two spares will return to their home base.

About 45 minutes prior to our take off window we get on the tanker and get settled in as the crew starts the engines and runs through a series of preflight checks.

It seems like just a few minutes later we are airborne. As we approach Nantucket I notice that we are actually circling the area. I thought

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this was odd, because I would have heard something about circling during the briefing if it was part of the plan.

Two issues have popped up. The tanker that was supposed to take off after us had a problem and could not take off. The crew had to get into another tanker and run through the preflight checks and get in the air as soon as possible to join us.

Also, one of the A-10's had a mechanical problem and had to return to his home base. That plane was replaced by one of the spare jets.

Soon we are heading out over the Atlantic above a deck of thick puffy clouds and the six A-10's from the Massachusetts Air National Guard are rotating to the refueling boom at the rear of our tanker. After each jet gets topped off with fuel, the Warthogs fly just off of the tanker's wings, three on each side.

A few miles behind us, just out of sight, the other tanker from Pease is flying with the six jets from the Connecticut Air National Guard.

During one of the refuelings I walked to the rear of the tanker and stepped down to the Boom Operator's seat. It's not really a seat. The boom operator actually lies down on his or her stomach. There is a chin rest to help the boom operator face to the rear of the tanker.

I was able to lie down next to the boom operator and view the A-10's approach. The boom operator, with both hand and foot controls actually "flies" the boom into position. The receiver approaches close to the boom, then the boom operator makes adjustments to put the boom into the receptacle in the nose of the A-10, and activates the necessary pumps to fill the fuel tanks. When the A-10 is full of fuel, the boom operator disconnects from the A-10 and waits for the next one to move into position seconds later.

After refueling all six jets three times, we approach the meeting point where the other two tankers take the A-10's the rest of the way to the Azores. Soon we turn around, speed up and head for Pease. For the distance traveled, it was a long flight. KC-135's could fly the route much faster, but the A-10's can't. We actually had to slow down to allow the A-10's to keep up.

Whatever it takes to get the job done and get the fighter aircraft where they need to go, it's all in a day's work for the New Hampshire Air National Guard and the Northeast Tanker Task Force, 24 hours a day.

(See page 62 for more on tuning in aerial refueling comms - ed.)

Department of Defense Aerial Refueling Frequencies

By Larry Van Horn, MT Milcom Columnist

Continental US Coronet Deployment Refueling Frequencies

Desig	*Primary*	*Secondary*	
Alpha	396.200	394.600	Callsign 1x
Bravo	391.000	388.400	Callsign 2x
Charlie	378.200	375.700	Callsign 3x
Delta	373.200	370.400	Callsign 4x
Echo	314.500	297.300	Callsign 5x
Foxtrot	293.000	289.700	Callsign 9x
India	254.600	255.750	Callsign 7x
Juliet	236.750	228.550	Callsign 8x
Kilo	343.100	322.800	Callsign 6x

Atlantic Coronet (East) Deployment Refueling Frequencies

258.000 268.400 270.400
282.000 286.600 289.600
296.400 299.500 303.300
306.500 308.000 314.500 316.350
318.000 327.600 339.000 339.400
344.100 355.200 356.450 360.200
375.700 378.200 380.550 391.000
396.200 399.400

European Coronet Deployment Refueling Frequencies

Desig	*Primary*	*Secondary*
Alpha	294.800	307.900
Bravo	296.500	380.800
Charlie	298.100	340.650
Delta	299.700	380.800
Echo	340.650	344.100
Foxtrot	268.250	307.900
Golf	246.050	340.650

Air Combat Command Spare, Emergency (Contingency) Refueling

238.650 264.900 288.900 352.700

Air Combat Command Continental US Random Refueling Tracks

228.550 236.750 254.600
255.750 266.500 275.950
276.100 286.900 289.700
293.000 297.300 314.500 322.800
370.400 391.000 394.900

Aerial Refueling Anchors (Primary and Secondary frequencies)

235.100 238.900 255.750 258.725
260.200 263.900 270.200 275.950
276.500 276.700 278.400 279.800
282.700 283.800 283.900 286.200
286.300 290.975 291.900 292.600
293.525 295.400 295.800 296.000
299.600 305.500 312.150 315.825
315.925 318.000 318.100 319.500
319.700 320.900 324.400 324.600
340.700 340.750 341.400 343.500
344.700 347.200 348.900 352.600
359.100 360.900 366.300 384.600
391.800

Aerial Refueling Established Tracks (Primary and Secondary frequencies)

235.100 238.900 243.300 260.200
260.300 263.900 270.200 276.500
282.700 283.900 286.300 286.600
288.700 288.800 291.900 292.600
295.400 295.800 297.200 299.600
305.500 314.300 315.900 315.925
318.000 319.500 319.700 320.900
324.600 327.600 329.200 333.300
336.100 337.400 339.200 339.700
340.700 343.500 344.700 348.900
351.800 352.600 356.450 358.200
358.400 359.100 361.700 365.400
366.300 367.400 371.800 384.600
387.900 389.000 394.900

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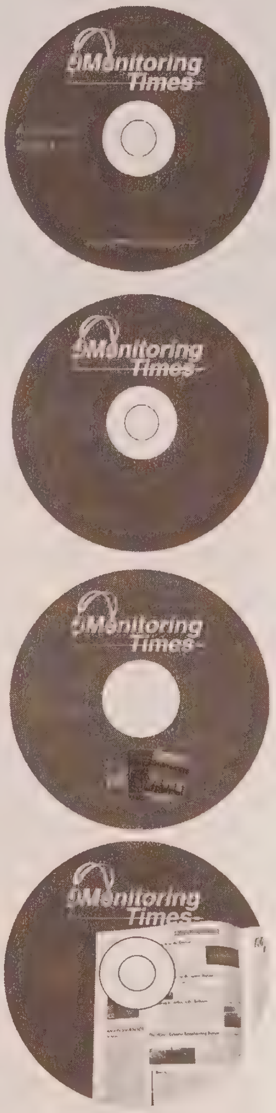

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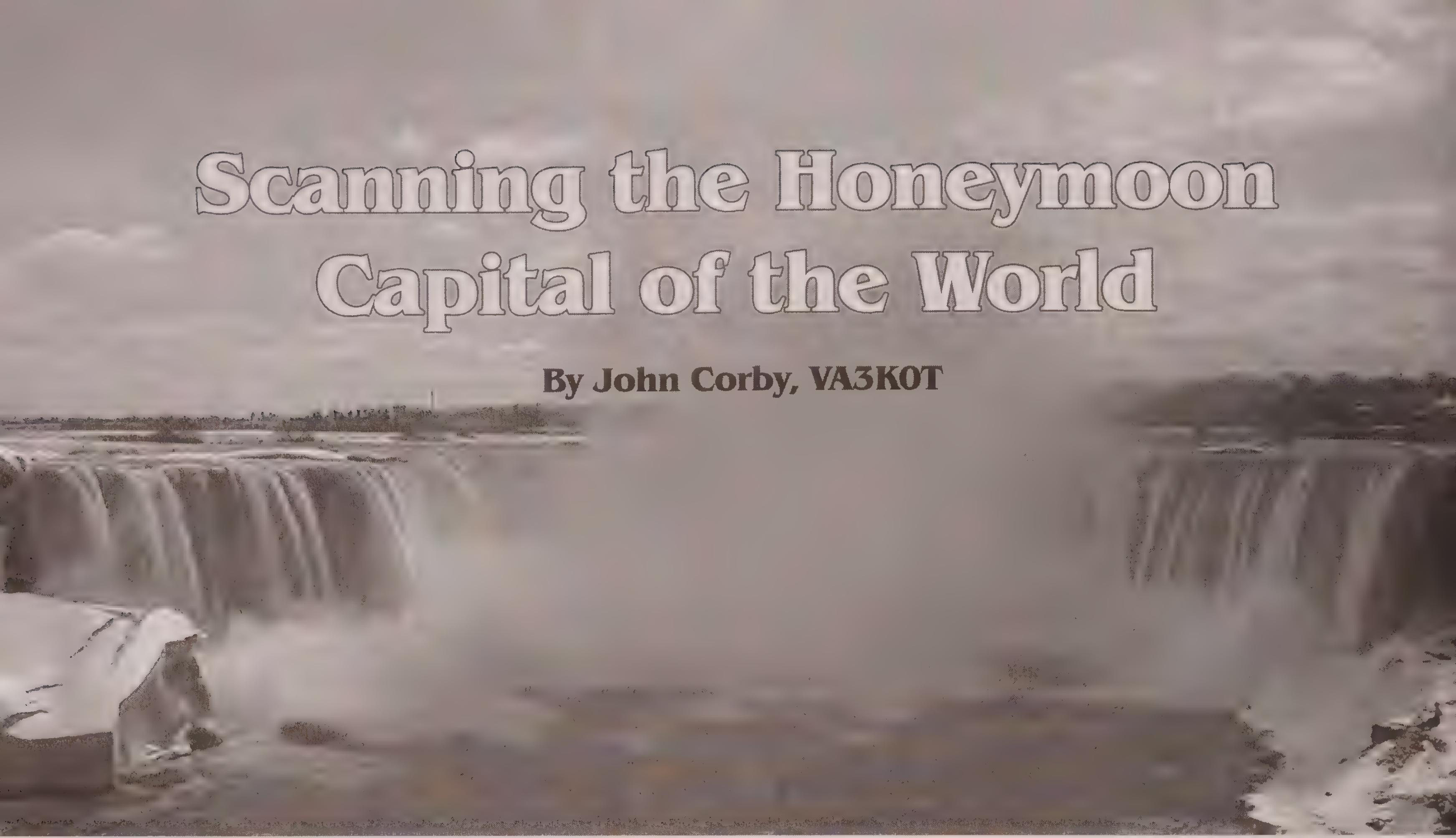
Scanning the Honeymoon Capital of the World

By John Corby, VA3KOT



The Canadian Falls and the Rainbow Mist (Photos by John Corb

I have to admit I am lucky; lucky enough to live within an easy two-hour drive of one of the busiest and most exciting natural attractions in the world. My first trip down to Niagara Falls, over twenty years ago, was in the middle of winter. I repeated the trip many times during the intervening years, but this spring I went armed with a bag full of radios, frequency counter, GPS, and camera.

I was busy. Niagara Falls is bustling with activity and, even though the late spring this year meant that I would be faced with braving a bright, but cold and icy trip, I drove down the Queen Elizabeth Way from Toronto to the international border and set to work.

There are many tourist distractions in the falls area, but few of them generate much interest from a scanning perspective. I focused on those that would be most likely to break squelch on my radios. Of course, the big attraction is the two huge waterfalls on the river. Niagara Falls is said to be the third largest waterfall in the world when measured in terms of the rate of flow of water. I am quite sure that it rates number one in terms of development and accessibility.

MT Readers who visit Niagara Falls may have great difficulty in confining their visit to activities related to radio, so you will have to forgive a little digression into a general description of the area's attractions.

The Niagara River

The Niagara river, with a length of only 56 kilometers (35 miles) is one of the shortest rivers in the world and yet it is also one of the most spectacular. The Niagara river drains the waters of four of the five great lakes into Lake Ontario, which itself empties into the St Lawrence Seaway and then into the Atlantic Ocean. The elevation of the river drops 99 meters (326 feet) from its source at the end of Lake Erie, near the American city of Buffalo and Canada's Fort Erie, to its mouth at the beautiful small town of Niagara-on-the-Lake on Lake Ontario. At the halfway point is the most famous feature of the river, where the water flow spills over the precipice of the Niagara escarpment at Niagara Falls.

The Niagara river is also an international boundary separating the United States and Canada, which makes it twice as interesting from a monitoring perspective. As a Canadian, I visit and monitor my own side of the river, but there is an equally rich slice of the spectrum to be monitored on the US side as well. This article will only deal with Canadian scanning targets, but perhaps an American contributor will respond in a future issue of *MT* with the scene from the other side of the river.

There are actually three cataracts at Niagara Falls, the Canadian Falls (aka the Horseshoe Falls due to its shape), the American Falls, and its tiny but very attractive companion, the Bridal Veil Falls. The total waterflow over the combined falls is approximately 168,000 cubic meters (6 million cubic feet) every minute.

The falls have an interesting history going back 12,000 years. They have eroded their way upstream by several miles during that time. Erosion was causing a rapid retreat of the falls that was slowed only by the introduction of water diversion to feed the hydroelectric generating stations on both sides of the river. The flow of the river is now regulated (and reduced at night and during the winter) to stabilize erosion while feeding the electric power requirements of southern Ontario and western New York.

The Canadian Falls

The Canadian Falls is the principal attraction. Despite its name, it is shared by the two countries, although the international boundary line leaves most of it inside Canada. It is a giant horseshoe shape cataract 675 meters (2200 feet) long and 52 meters (170 feet) high. Visitors can stand within a few feet of the precipice or, for a small fee, explore the scenic caves behind the waterfall.

During its history the Horseshoe Falls has seen its share of daredevils who have risked death and prosecution for a brief moment of fame or infamy. Tightrope walkers have entertained the crowds while poised on a wire above the thundering cataract. Many others have attempted to go over the precipice of the Canadian Falls in a barrel, often paying the price of an early arrival in eternity. The base of the Canadian Falls is a basin whose water depth is equal to the height of the falls itself. The vortices in the basin, created by the colossal volume of water plunging over the precipice, can trap a daredevil's barrel long enough for the supply of air to be exhausted. In other cases, the shock of the fall killed the occupant.

Stunts are now strictly illegal and are met with a swift reaction from police and serious consequences following prosecution. During one visit I witnessed a group of climbers who attempted to rappel down the side of the gorge just below the Horseshoe Falls. They were arrested before they had finished setting up their ropes.

Unfortunately there is also an even darker side to the falls. Between 20 to 40 people per year end their lives by leaping into the river just above the brink. During a visit to the falls in April I witnessed one such very disturbing event myself. This kind of event is likely to create radio traffic on emergency services frequencies, particularly if there is any prospect of live recovery. Many years ago a boating accident did result in a child going over the Horseshoe Falls; the child survived following a dramatic rescue by the *Maid of the Mist* boat crew.

The American Falls

The American Falls is so-named because it is located entirely within the United States. Despite, or perhaps because of this, it is best seen from the Canadian side of the river. The American Falls is slightly higher the Canadian Falls at 56 meters (180 feet), but the water drop is not as spectacular because the water falls onto a huge mound of rocks before it meets river level. The width of the American Falls is 328 meters (1075 feet). For the adventurous, there is a highly slippery, wooden boardwalk at the base of the cliffs from which a first class view of the thundering flow over the precipice can be witnessed. Waterproof clothing is provided, but as recommended by more than one area attraction, when visiting Niagara Falls take a change of clothes.

The Weather

Niagara Falls is said to generate its own weather – wet and misty. The spray thrown up by the huge plunge of millions of gallons of water creates a permanent "rainbow mist." The rainbow effect is caused by sunlight shining through the mist. In winter, the spray of the rainbow mist freezes on the trees as it falls and creates spectacular natural ice sculptures. In mid-winter the river is often completely frozen over near the base of the falls and millions of gallons of water disappear beneath the ice. The water flow is lower during the winter season as the hydro-electric generating stations divert more water upstream.

In summer, the weather is usually warm and sunny – and wet and misty. Keep the "Rainbow Mist" in mind while operating your scanner in the immediate vicinity of the Horseshoe Falls. A plastic bag over the scanner is highly recommended. Without protection, your very expensive radio will get a thoroughly good soaking from which it may never recover. (Take this advice from one who once stepped into a hot tub with an electronic device in his shorts pocket. The terrible moment at which I realized what I had done will haunt me forever.)

Casino Niagara

The casino is a fairly new addition to the attractions at Niagara Falls. It is located on the Canadian side of the river and has become a major draw for Canadians and Americans alike. The facility has all the usual devices for relieving patrons of their life savings, including an army of the ubiquitous one-armed bandits (slot machines).

The casino is also a good monitoring target and, on the right occasion, might yield some interesting traffic. Casinos exercise very tight security, for obvious reasons, and you may just pick up a hint of a security event by monitoring the frequencies listed in the accompanying frequency table. The 800 MHz frequencies appear to be part of a trunk group and are very active. Casino radio traffic can be monitored from outside the building, but beware, electronic devices are not permitted inside the casino.

Maid of the Mist

There is a legend from the native peoples of the region of a god called Hinum who lived with his sons in a cave beneath the American falls. Many of the people were dying and believed that sacrifices to Hinum would relieve their suffering. A maiden from the village would be selected to ride over the falls in a canoe in a fatal gesture designed to appease Hinum. One day the lot fell upon the beautiful young daughter of the chief. Her name was Lelawala and she rode her canoe over the brink of the falls to her death. The legend tells of how the chief was so distressed that he too jumped into a canoe and went over the falls himself. Lelawala became the original "maid of the mist."

Today, the *Maid of the Mist* is a spectacular boat ride upriver into the spray at the base of the Horseshoe Falls. Powerful double-decker boats carry rainsuited passengers against the enormous currents at the base of the falls. The boats struggle to within a few yards of the very base of the giant cataract where the drenching spray from the falls and the heaving river surface create the illusion of a mighty storm lashing the boat. Then, all too quickly, the boats turn around and race with the current back to their docks.

The *Maid of the Mist* operates from both sides of the river and is an attraction that is definitely not to be missed. No Niagara experience is complete without riding on one of these boats. If you have never had the good fortune to visit Niagara Falls, you can get a good Maid of the Mist multimedia virtual experience by visiting the equally spectacular website at **http://www.maidofthemist.com**.

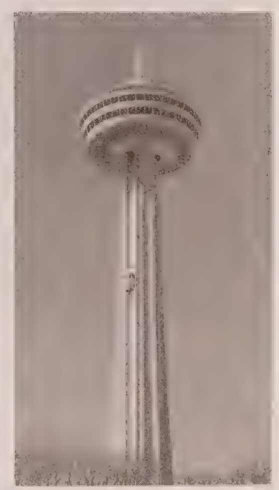
Not surprisingly, the frequency to monitor is in the marine band (see frequency table). The *Maid of the Mist* is a seasonal attraction, so if you visit Niagara Falls during the winter months you won't hear anything on this frequency.

Scenic Helicopter Rides

Airborne, rotary wing tours are available from two companies, Niagara Helicopters and Skyway Helicopters, for those with deep pockets. This may be the ultimate thrill ride to see the splendor of Niagara Falls from the air directly above the cascading water. However, be warned, the cost is even higher than the ride! Helicopters operate all year round and can be heard in the aircraft voice band, with another frequency in the UHF range (probably for handheld radios). See the frequency table for details.

Skylon Tower

The Skylon Tower, standing near the Horseshoe Falls on the Canadian side, provides a great vantage point for viewing the falls area as well as the surrounding countryside for up to 80 kilometers (50 miles) away. The tower stands 520 feet tall and was built from nearly 28 million kilograms (over 61 million pounds) of concrete. Near the top of the tower is a three storey dome featuring a revolving restaurant and an observation deck. A tiny 3 hp motor turns the restaurant level through one



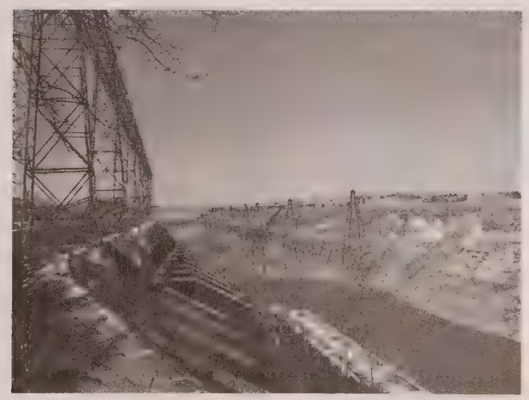
complete revolution per hour – just enough time to complete a light lunch while planning a move onto the other area attractions, many of which can be seen from the tower.

Although built as a tourist edifice, the antennas on the tower give a clue to its secondary use. High places are sought-after by every commercial (and amateur) radio station. The three yellow elevators whisk visitors to the observation deck at a rate of 50 feet per second. If you are athletically inclined, there is an optional 662 stair climb.

Skylon's promotional material details another feature that got me to wondering whether former US President George Bush Senior ever visited Niagara Falls. President Bush is often quoted as having said "I see a thousand points of light." The Skylon Tower has 1000 pinhole lights.

Power Generation

The Niagara river has been used as a source of hydro-electric power generation for over a hundred years. Today, the United States and Canada both use the power of the river for supplying their electrical needs. On the Canadian side, the Sir Adam Beck generating station feeds nearly two million kilowatts of power into the high voltage lines feeding homes and industry throughout southern Ontario. Several VHF frequencies are available to monitor (see table), but traffic may be limited.



Travel downriver toward Lake Ontario to view the enormous generating stations on both sides of the river. The huge structures on both the American and Canadian sides are an impressive example of civil engineering.

Marineland

Marineland is a large theme park in Niagara Falls that is well worth a visit, especially if you have young family members. The park has a dolphin and orca display, a deer park and a good selection of thrill rides. You can park your car in the remote lot, and monitor the park frequency (see table) while you wait for the shuttle bus ride into the park.

Clifton Hill

BURGER KING

While in Niagara Falls (Ontario) you are sure to be drawn to the bright lights and tacky entertainment on Clifton Hill. Here you will find the house of horror, wax museum, fast rides and fast food. Believe it or not, you scan Ripley's theatre here, and not much else. But, just like I did, you may want to grab a burger and some down time during your visit. I used the break in a Clifton Hill burger joint to program some more frequencies into my scanner.

Niagara on the Lake

The beautiful and serene small town of Niagara on the Lake lies at the mouth of the Niagara River where the water flows into Lake Ontario. Opposing forts on each side of the river bear witness to the history of the town and the fact that Canada and the United States have not always been peaceful neighbors. Invasion by the Americans is still going on today as it was during our little dispute of 1812, but now our friends to the south bring cameras and greenbacks to spend in the tea shops and antique stores of the town.

Niagara on the Lake is perhaps most famous for the annual Shaw Festival. This event (see frequency table) is an internationally famous annual theatrical event held in the town.

The Rainbow Bridge

If you are visiting western New York or southern Ontario, it really is worth a side trip to Niagara Falls. It is not just Canadian pride that prompts me to observe that the Canadian side of the falls has more attractions. So if you find yourself on the US side, be sure to take that drive across the Rainbow Bridge and come and see us. The Stars and Stripes meets the Maple Leaf halfway across the bridge. You can even walk across and take in the spectacular view from between the flags. The Rainbow Bridge is the closest border crossing point to the Falls and you really can see a rainbow in the mist when the sun is shining.

Frequencies to Monitor on the Canadian Side of the Falls

Regional Municipality of Niagara
  General 149.495 151.205
  Works Department 156.015 169.185

Niagara Parks Commission
  150.455 151.040 151.100 151.970 452.1375 451.1875 453.5625 456.1875 462.2625

City of Niagara Falls
  General 150.545 469.2625
  Works Dept. 148.630 149.495 151.625 169.440 169.560 172.065 172.065
  Fire Dept. 150.545 153.800 154.070 155.865 469.425

Transit, Roads & Bridges:
  Greater Niagara Falls Transit Commission 406.9625 408.6625 469.425
  Niagara Falls Bridge Commission 452.7625 457.7625

Electric Power Generation:
  Canadian Niagara Power Company Ltd 158.625 159.975 952.83125
  Niagara Falls Hydro Inc 167.520 172.290
  Ontario Power Generation Inc. 47.380 460.8125
  Niagara Falls Hydro Inc 151.625

Civil Air Rescue Service 151.055

Entertainment:
  Marineland 454.225
  Ripley's Moving Theater 451.6625
  Double Deck Tours (imported buses from London, England) 453.262500 458.2625
  Niagara Helicopters Limited 129.475 462.2625
  New York Hospitality Inc. 469.2625
  Niagara Duty Free Shops Inc. 469.2625
  Casino Niagara 460.7875 465.7875 813.025 813.275 813.525 813.775 814.025 858.025 858.275(data) 858.525 858.775 859.025
  Maid of the Mist 156.900
  Niagara Gorge Jet Boating Ltd 156.500

Greater Niagara General Hospital 469.425

CJRN 710 Inc. CJRN (710 AM) is an all-news radio station
  450.8625 455.1625 956.1250 (Skylon Tower)

Niagara on the Lake:
  Province of Ontario GMCO (Government Mobile Communications Office) (believed to be trunking frequencies) 149.440 149.725 149.830
  Fire Dept 153.770 153.800 154.070 414.3875
  Public Work Dept/Niagara on the Lake Hydro 154.220000
  Shaw Festival 462.8125

St Catherines/Niagara District Airport:
  Radio/VDF (VHF Direction Finder): 123.25, 126.7
  Mandatory Frequency: 123.25
  NDB: "SN" 408KHz (Lat: 43 08 49N; Long: 79 15 17W)
  Niagara Falls VFR (Visual Flight Rules) Pattern Frequency: 122.05

Niagara Falls, New York:
  ATIS (Automatic Terminal Information Service): 120.8
  Tower: 118.5

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Become a Frequency Detective

You can find discreet channels in use in your own town

By Chuck Gysi, N2DUP

On-site activities, stakeouts and raids typically are coordinated on police frequencies that are used exclusively for discrete purposes. By identifying these channels, you may hear drama in real time.

Radio waves are passing through your home, your office and your mobile installation every day. But though you are surrounded by them, some of these frequencies remain "hidden" in plain view. They may be channels used on infrequent occasions or only for special purposes. The good news is that they are fully licensed and they are active, though perhaps not on a daily basis. With a little investigation you can find these "discreet" channels and further enhance your monitoring efforts.

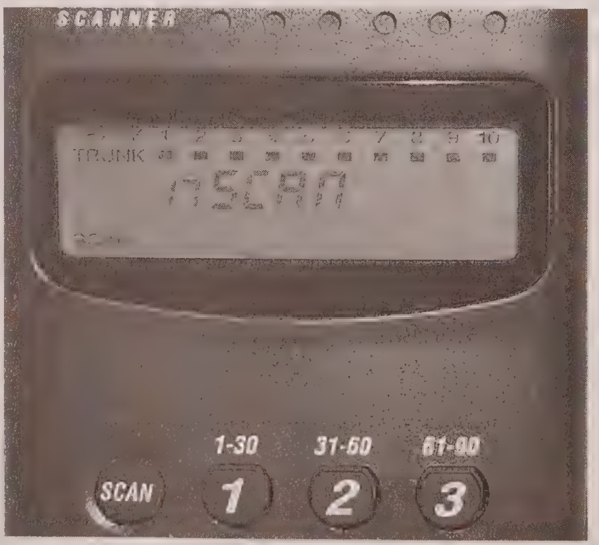
Scanner Boot School

To find those secret signals, to recognize the extraordinary, you first have to be fully familiar with the ordinary. Those who become frequency detectives know when all the good stuff is happening. They know when things are getting interesting and they enjoy a better sense of what really is going on in their community. Frequency detectives have a firm grip on the scanner hobby in their community and may actually find themselves being a resource not only to other hobbyists, but even to public safety in their own community!

But anyone wishing to be a frequency detective has to start at the beginning. The basics. The everyday stuff. They have to know the F1s (primary channels) and the dispatch channels. If you already have a scanner, the odds are very good you're already at this point. You know when there is a major incident in your community because you monitor the dispatch channels for your local police and fire departments. You probably monitor the EMS dispatch channels, too. Those are the basics.

If you haven't quite figured out this stuff yet for your community and perhaps surrounding communities, start with a good frequency directory. *Police Call* is easily available at Radio Shack stores or by mail order from companies such as Grove Enterprises; it offers a lot of help finding the main channels in use in your community. Yes, there is a lot of directory information in *Police Call*, but read the introductory material, too, and you'll be on your way to figuring out what's important to monitor in your locale.

Your local radio stores might have frequency lists available for free or nominal charge. Get your hands on these lists. However, keep one thing in mind: this is just a starting point. Most of these handout frequency lists are riddled with mistakes. I've collected lists from all over the country and, in sheet after sheet, there are frequencies listed 5 kilohertz off frequency, incorrect users, incorrect channel identifiers, and more. But they do offer a good start at the right price – as long as you don't accept the information as gospel.



Place in your scanner all the frequencies licensed to your city or municipality. Then try to identify the usage on each channel over time. That will help you uncover special-use frequencies. Photo by Chuck Gysi, N2DUP/scancomm.net

Many areas also have local scanner directories, such as the revered *Scanner Master* guides. In addition, many scanner hobbyists post their own scanner information on web sites they personally create. Using search engines, you may find a good site for your community. Like other scanner hobbyists, I post some of my fun finds at my web site at **http://www.scancomm.net**.

Moving Past F1

Once you have identified all the primary channels for your community, it's time to start identifying the secondary channels. These are the channels that are used every day for auxiliary use. These include channels used by police for license plate information look-ups, fireground operations, and EMS chatter. In many cases, these channels will be referred to names such as "info," "car-to- car," "fireground," "operations" or "ops" and simply as "F2" or "Channel 2."

These channels may be easy to identify. While monitoring the dispatch channel, the dispatcher may tell a police officer to switch to "Channel 2" or "Info." If you have the primary frequencies for your community programmed into the scanner, you'll easily discover what channel is being used for this purpose. Make a note of the frequency and what its usage is for future reference.

You may discover that there are several secondary channels in use in your community. In addition to the police dispatch channel, there may be channels used for license plate information look-ups ("info"), car-to-car, mutual aid (with surrounding communities and agencies), detectives, and more. Some channels get used more than others. Those with dedicated purposes other than dispatch don't get used as often, whether during the course of a day or

Surveillance activity is one type of channel usage you may find on police frequencies. Police units will follow their suspects in traffic. Photo by Chuck Gysi, N2DUP/scancomm.net

the course of a week.

Detecting Discreet Channels

OK. You've identified most of the channels used in your community in the course of any given day. (In smaller towns, that might be week!) Now it's time to move on and start finding secret channels that don't show up on handout frequency lists and sometimes don't even show up on hobbyist web pages.

You'll need a database to start work with. For many, the regional volume of *Police Call* for your area works best. You're about to dissect the information contained within the directory and start finding hidden channels. Do all areas have secret channels? No. But on the other hand, many areas DO have secret channels that are hidden amongst all the frequencies licensed to a community.

If you don't have a copy of *Police Call* readily available (it is, after all, the scanner users' bible when it is published every fall), you can try to figure out how to obtain similar raw information online at the Federal Communications Commission's web site at **http://www.fcc.gov/wtb**. It will take you a little longer to sort through the databases online, especially if you have a slower dial-up connection, but it can be done.

Start looking up all the licenses held by your community. You will find the stuff you're already listening to listed, such as the dispatch and "switchover" channels. But, wait! There are other channels listed, too. For instance, there may be several frequencies licensed for mobile use only. In addition to frequencies for police and fire use, there may be frequencies licensed for "local government" use. In *Police Call*, these are indicated with an L. In the FCC's database, all public safety, including local government operations, are indicated by the "PW" radio service indicator. It's now a catch-all category, whereas in the past the FCC licensed fire, police, EMS and local government operations separately.

In many communities, these so-called local government channels may be used for the inside operations of your municipal government. These include activities such as streets department, sanitation, utilities, parks and recreation, and more. In the community where I live, local government channels are used for an arena's operations, airport operations, and most city services such as streets and parks.

But there may be some local government channels licensed that don't look familiar or may stick out like a sore thumb. In one community where I used to live, there has been a local government channel licensed to the municipality for years, and while it has never been used for any particular government operations, it has served its purpose by being the community's fire police operations channel. No, it's not licensed to the fire department, and you won't hear the channel in use unless there is a fire in town. Being a good frequency detective means monitoring this frequency day in and day out until you hear something on it and you are able to identify it. Once you have identified its use, you're ready to move on to another unknown channel.

Repeater Tricks

Your local police department may be licensed to use numerous channels. Two channels might be used for dispatch purpose. Yes, two channels. In repeater operations, mobile and handheld radios transmit on one channel and are retransmitted on another channel. This affords citywide or countywide coverage for mobile and handheld radios, typically from tall towers or mountaintops. You know you have found both the repeater input and output channels if you hear the same thing on both simultaneously. The signal from the mobiles may not be as strong on the repeater input (unless they are right in your immediate neighborhood).

If there is any repeater operation in your community, you want to identify these channels right away, because you don't need to monitor the input channel to the repeater. That is, with one exception. In some areas, when sensitive information needs to be passed from the officer on the street or the fire chief to the dispatcher, they may be able to "disable" or turn off the repeater. In doing such, the mobile's signal is not repeated through the repeater all across the city or county. Only the dispatcher hears the message when the repeater is turned off. In this instance, if you are monitoring the repeater input channel, you'll hear the information being relayed to the dispatcher. If this is done in your area, there may be a specific radio code that is used to alert the dispatcher to turn off the repeater.

Once you have identified the primary, secondary and repeater input channels, you can start identifying other channels your local police may be using. Look at all the other frequencies licensed for police or local government use. Perhaps there is a mobile license for the police department with only a few mobiles licensed to it. This possibly could be used by a detective squad. Its use may be sporadic, perhaps just for stakeouts or surveillance, but if it's licensed, it's likely to be used sooner or later.

You may find other police frequencies used for specific purposes, too, such as 155.475, the national mutual aid channel, or 155.370, which is commonly used for point-to-point communications in many areas. You may find your local police department is also licensed on the frequencies used by a nearby police department, or it may be licensed on county frequencies, not only for communicating with county dispatchers, but with other nearby police departments, too.

Nighttime Surprises

However, if you really want to find the hot channels, you need to listen in the evening and late at night. This is when I have found the most interesting use of frequencies. That is when crime

Frequencies used on the scene of emergency situations may be removed from routine dispatch channels. In addition to EMS chatter channels and fireground channels, there also may be those discrete channels used by units such as fire police. Photo by Chuck Gysi, N2DUP/scancomm.net occurs – at night – so that is when you really need to listen.

One afternoon while driving home from work, I was keenly entertained by a police surveillance operation going down on a frequency I like to monitor. But what was odd about it was the frequency that was used. The squads participating in this operation were operating on the output frequency of the local emergency management repeater. Almost all operations on this repeater are through the repeater, such as storm spotting. However, operating simplex, or car-to-car, on the repeater's output frequency was a real-life stakeout. I was delighted to hear such an operation, but mildly amazed at the frequency selection.

Likewise, as I was monitoring the frequencies in use in my community, I started to hear late-night chatter on the local government channel used during the day by streets and parks and rec. The chatter sounded somewhat police-related, though. By continually monitoring these communications late at night, I finally figured out that the city's local government repeater is used at night by the city's park rangers. The police dispatcher monitors the channel in case one of the park rangers needs assistance, but they mainly were dispersing troublesome folks in the city's parks at night.

And, here's an even odder situation that I stumbled across. The county road department in my county seems to have only half a license anymore. The repeater's input frequency is licensed, but not the output frequency. I am not sure why, but anything can happen. Well, as I monitored the input frequency (as a new resident I didn't know the output), I sometimes heard what sounded like police-like communications at night, much like I did on the city's local government channel. I then also noticed I heard similar activities on a repeater output channel, but it wasn't licensed to any city or county nearby. But the repeater's signal was too good to possibly be coming from the next state away, where the nearest station was licensed. A quick check with some fellow scannists on a state scanning listserve on the Internet proved that, yes indeed, the county's sheriff's deputies used the road department repeater at night for chit-chat, when road workers aren't out on the job.

I tell these stories only because you may find similar situations in your community. In another community in which I lived, the police department was licensed for a whole bunch of channels. I never heard activity on any of these possibilities. However, I did hear them use the town's local government channel, especially during the day when City Hall could contact them that way without going through the county dispatcher; I also found them using a county car-to-car channel for routine speed traps. There were a lot of possibilities, but they turned up in some unexpected locations.

Other Hiding Places

Police departments can sometimes be intentionally sneaky about where they conduct their radio operations. They may be obvious or they may not. One department in a community where I worked frequently told officers at night to switch to "Charlie." Sometimes they were told to go to "Charlie-8." We finally figured out they were talking on CB! Charlie was CB and they typically went to CB Channel 8. Case solved.

In another community, the local police department went as far as to license the municipality on an itinerant business frequency – 151.625 MHz, and proceeded to use this channel as their secret speed trap channel. Would you find this easily in *Police Call*? No. Would you find it easily in the FCC's online database? No. But you might find it sooner or later, especially if you do a search of all licenses in your community, or those licensed to the municipality or county where you live. That's how one radio hobbyist found the speed-trap business channel.

Some police departments may have the capability to operate on local school bus channels or even municipal utility channels. In areas with marine activity, VHF marine channels may be programmed into police and fire vehicle radios. Anything is possible, if you take the whole of the frequency usage and figure out all the possibilities.

Don't overlook other possibilities, too. Some police departments (though very few) may be grandfathered to operate on General Mobile Radio Service (GMRS) systems in the 462 MHz band. Also, some officers might even carry Family Radio Service (FRS) or Multi-Use Radio Service (MURS) handhelds on 462 and 467 MHz and 151 and 154 MHz for chit-chat, surveillance operations or to monitor for criminal activity.

Any time there are large gatherings of people, additional police frequencies may be pressed into use for event coordination. Police on-site of large events offer security to event-goers.

Special police tactical units may have their own discrete radio frequencies that are removed from routine dispatch or car-to-car channels. You'll hear real-time events unfurl right in front of you by monitoring these channels.

Don't forget county and state channels that might be used on a local basis. Many states are now designating statewide mutual aid channels for all emergency services to use, such as Iowa's 151.475 MHz "Iowa" channel or New Jersey's 153.785 SPEN-4 channel.

Tuning In

If you're monitoring only the routine channels for emergency services in your community, you may be missing some exciting communications that might be a surveillance, a speed trap, a drug bust, cop chatter, detectives, or more. By becoming intimate with all the frequencies in use in your community by emergency services, you'll have a better understanding of what types of work your emergency workers perform, let alone letting you become more knowledgeable with what's going on.

You may decide that some channels may be too sensitive to let others know you found it. Other channels you may be excited to share with other hobbyists. Go out there and search. There are frequencies waiting to be found by frequency detectives. Enjoy!

About the author

Chuck Gysi, N2DUP, is a career journalist who has been writing for radio publications for three decades. A longtime newspaper editor and free-lance journalist, he has been published in publications such as *QST* and *73* and others ranging from *Grit* to *Glamour*. He also is an editorial assistant for *Police Call*. He lives in Rochester, Minn. He can be reached through his web site at **http://www.scancomm.net** or by e-mail at *chuck@gysi.net*.

Crisis on the Korean Peninsula

By Larry Van Horn, *MT* Assistant Editor

The nuclear crisis on the Korean Peninsula continues to heat up. Here is a quick guide to help shortwave radio listeners monitor the situation from stations in the region.

Broadcast frequencies are courtesy of Gayle Van Horn and the *MT* Monitoring Team. All frequencies are in kilohertz and times in UTC. See page 42 for target area abbreviations.

Shortwave Broadcast Stations

Voice of North Korea, Pyongyang, North Korea

0100-0156	3560as	6195as	6520am	7140as
	7580am	9345as11735am		
0200-0256	4405as	9325as	11335as	
0300-0356	3560as	6195as	7140as	9345as
1000-1056	3560as	9335am	9849as	11710am
	11735as			
1300-1356	4405as	7505eu	9335na	11335eu
	11710am			
1500-1556	4405as	7505eu	9335am	11335eu
	11710am			
1600-1656	3560as	9975af	11735af	
1900-1956	4405as	7505eu	11335eu	
2100-2156	4405as	7505eu	11335eu	

Radio Korea International, Seoul, South Korea

0000-0059	15385am		
0200-0256	9560as	11810as	15575na
0800-0900	9570om	13670eu	
1130-1200	9650na		
1200-1230	9650na		
1300-1400	9570om	13670om	
1600-1700	5975om	9515af	9870af
1900-2000	5975om	7275eu	
2100-2130	3955eu		

China Radio International, Beijing, China

0100-0156	9580na	9790na		
0300-0356	9690na	9790na		
0400-0456	9560na	9755na		
0500-0556	9560na			
0900-0956	11730pa	15210pa		
1000-1056	11730pa	15210pa		
1200-1256	9730as	9760pa	11760pa	11980as
	15415	pa		
1300-1356	7405na	9570na	11760pa	11900pa
	11980as	15180as	17720na	
1400-1456	7405na	9700as	11675as	11765as
	13685af	15125af	17720na	
1500-1556	7160as	9785as	13685af	15125af
1700-1756	9570af	9695af	11910af	11920af
1900-1956	9440af	13790af		
2000-2056	9440af	11640af	13630af	15110eu
	17790eu			
2100-2130	11640af	13630af	15110eu	17790eu
2130-2156	15110eu	17790eu		
2200-2256	9880eu			
2300-2330	5990na	13680na		
2330-2356	5990na	13680na		

Radio Japan, Tokyo, Japan

0000-0015	6145na	13650as	17810as	
0015-0100	6145na			
0100-0200	11860as	11880me	15325as	17560me
	17685pa	17810as	17835sa	17845as
0300-0400	17825ca	21610pa		
0500-0600	5975eu	6110na	7230eu	11715as
	11760as	15195as	17810as	21755pa
0600-0700	7230eu	11740as	13630na	13630na
	15195as	17870pa	21755pa	
1000-1100	9695as	15590as	17585eu	21755pa
1100-1200	6120na	9695as	15590as	
1400-1500	7200as	9505na	11730as	11840pa
	11755me			
1500-1600	7200as	9750as	11705na	11730as
1700-1800	9505na	11970eu	15355af	
2100-2200	6035pa	6055eu	6180eu	11855af
	17825na	21670pa		

Siping
Hunjiang
Tumen
Vladivostok
Russia
China
Musan
Khasan
Najin
Badaojiang
Shenyang
Tonghua
Ch'ongjin
Anshan
Ji'an
Hyesan
Manp'o
Kanggye
Kimch'aek
Sup'ung-ho
Dandong
Sinuiju
Kusong
North
Yongbyon
Hamhung
Korea
Sojoson-man
P'YONGYANG
Wonsan
Nampo
Korea Bay
Sariwon
Demarcation Line
P'yonggang
Changyon
Ch'orwon
Haeju
Kaesong
Munsan
Ch'unch'on
Kangnung
Paengnyong-do
Sumwi-do
Ullung-do
South
Inch'on
SEOUL
Wonju
China
Suwon
Korea
Ch'onan
Ch'ongju
Taejon
Andong
P'ohang
Yellow Sea
Kunsan
Chonju
Taegu
Ulsan
Kwangju
Masan
Pusan
Mokp'o
Yosu
Koje-do
Strait
Japan
Chin-do
Tsushima
Hiroshima
0 50 100 Kilometers
0 50 100 Miles
Lambert Conformal Conic Projection SP 23N/45N
Cheju-haehyop
Cheju
Korea
Fukuoka
Kitakyushu
Boundary representation is not necessarily authoritative.
Cheju-do
Sasebo
125
130
40
35

Utility Station

Korean Central News Agency (KCNA)

KCNA is the official news agency of the North Korean government. Title in Korean: Choson Chugang Tongsinsa. In addition to radioteletype services in English shown below, KCNA also transmits a facsimile service in English, Japanese and Korean on HF.

Tel: +850242149, Fax: +8502812421, Telex: 5475
Name of service: KCNA Radioteletype Service
Main studio center: Pyongyang

English (400 or 250 Hz shift/50 baud speed)

Asia	0400-0600	HMF46	10580
10001200	HMF88/HMF46	8152/10580	
1500-1730	HMF46		10580 (Pool Items)
Europe	0400-0530	HMF26	15633
10001200	HMF55/HMF26	11430/15633	
Americas	0400-0730	HMF52	11476 (Pool Items)
12301430	HMF52/HMF36	11476/13580	
2130-2300	HMF52		11476 (Pool Items)
Africa	0800-1030	HMF49	11536
12301430	HMF85/HMF49	8020/11536	
1800-2100	HMF52		11476 (Pool Items)

FAX Press Service (350 rpm/60 IOC)

2330-0030	HMF52	11476
2330-0030	HMY36	13580

Confessions of an On-Line Baseball Radio Listener

By Ken Reitz

Each summer for years I've been writing about my favorite summer time radio listening: Major League Baseball. Each year I list the flagship stations for each team. And, each year I have something unkind to say about MLB (you know, denouncing the owners for their schizophrenic views of Socialism and Capitalism) and Commissioner Bud Selig, in particular, for his apparently random captaincy of the whole listing ship.

In last year's exciting episode I bemoaned, "...Two years ago you could have listened to the games on your computer for free...Last year [2001] Major League Baseball saw fit to take control of the broadcasts and charged fans $10 to sign up for the season...This year [2002] they're charging $15. Want to guess what it'll be next year?" Well, fans, it *is* next year and, sure enough, the same package is now $20.

Succumbing to Temptation

As an avid baseball fan and radio listener I've done everything I could to improve baseball listening at my location. I have an array of receivers and DX enhancing devices. I've tried nearly every type of antenna in the book from tuned loops to terminated Beverages. But, there are still big problems with trying to satisfy my thirst for listening to the grand old game. I remain limited to listening to stations within a 500 mile radius of my location at night. And, it's impossible to listen to daytime games other than the occasional one played by the Orioles, which is tolerable AM listening at best.

The problem with night time listening continues to be the volatile summer storms, the fading, the adjacent channel interference and the fact that I'll never be able to hear the west coast games or the low power Spanish language stations, no matter how good conditions are or how fancy my receiving gear is.

Opening Day found me listening to the Orioles on WBAL and as I did so I found my web browser had wandered over to the Major League Baseball web site (http://www.mlb.com) and I was mesmerized by the chart under the banner "Game Day Audio: Listen Live." This chart listed every game to be played that day, the time, the teams, and the stations on which they could be heard. Under that banner the hook hung with the juiciest bit of bait imaginable: Sign Up Now for the 2003 Regular Season for Only $19.95.

I whipped out the calculator and found that, assuming I could listen to all 2,430 regular season games, it would cost under a penny each. I was actually able to resist for more than a week. But, during the second week I could no longer restrain myself from signing up. I was more than a little wary of how this would work. Mine is not the latest computer and I can never log on to a line faster than 32 kbs. After some initial hysteria concerning loading the latest version of RealPlayer (RealOne Player is required for listening) and the forgotten password, I was ready to start streaming the national pastime.

Baseball Fan's Paradise

With my current multi-band radio I have the memory presets lined up so that, just by rotating the preset knob I can click from one game to the next. With the combination of the radio, a selection of various antennas and the MFJ Noise Canceling Signal Enhancer, I can tune in as many as eight MLB broadcasts on any evening. But, with MLB GameDay Audio I could hear them all, including the very elusive cross continental flagship stations and the Spanish language broadcasts which are impossible to receive from the other side of the country.

I was reminded of a time as recent as five years ago when most MLB teams broadcast their radio feeds via analog Single Channel Per Carrier transmissions on C-band satellite. With a cheap TV band radio coupled to the composite video out on the satellite receiver, it was possible to tune them all in. Today these transmissions are made via digital SCPC signals which cannot be received on analog SCPC receivers. There are currently no analog SCPC baseball feeds of which I am aware.

So, what about my computer audio concerns? GameDay Audio is sent at such low bit rates, typically 11 to 20 kbs, that there is no problem with dropouts. Unfortunately, such a low rate also means that high fidelity is not possible, giving the broadcasts the sometimes distorted sound of a cell phone call.

Despite the low bit rate, the audio, for the most part, is on par with AM radio broadcasts. Some audio improvement can be had with a better set of speakers. The biggest problem is the data buffering which creates a lag between real time and on-line broadcast. This makes it impossible to watch the game on TV while listening to the broadcast on-line.

Another problem is taking calls on your computer while the game is going. You can adjust the settings in your dial up connection to allow in-coming calls to interrupt the connection if you have *call waiting*. However, some modems (mine for instance) won't drop the connection despite the settings, in which case you can use Catch-A-Call, available at Radio Shack, or similar product which allows you to take calls on the same line for up to 30 seconds before it drops the on-line connection. These units typically cost $50.

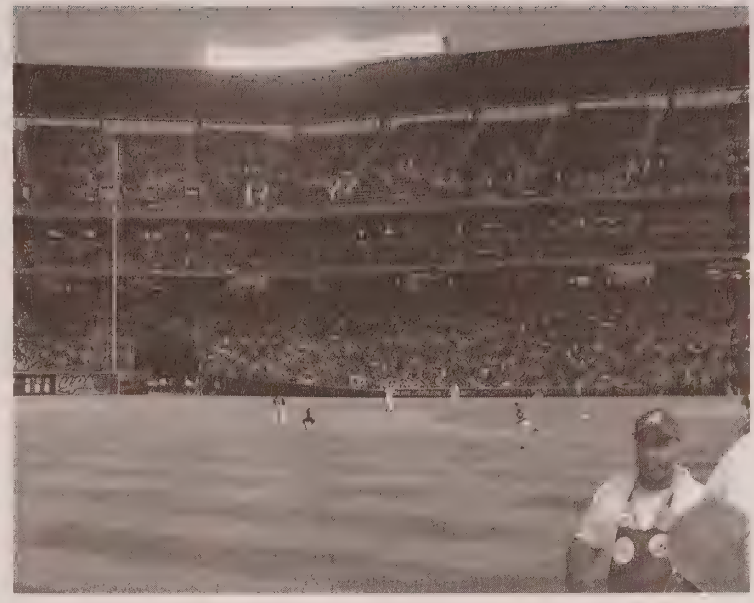
MLB Marketing Explosion

MLB Advanced Media is the name of the company charged with operating the on-line video and audio products offered through MLB. According to spokesman Jim Gallagher, the first year was beset with technical glitches and consumer resistance, because fans had enjoyed the previous year's games for free. Having worked out the technical problems and worn away fan reticence, MLB Advanced Media finished the second year with a million subscribers and actually turned a profit. So far this year, Gallagher says, subscriptions are doing well.

Does this mean we can look for another price hike next year? If so, how high can the price go before turning off fans? Gallagher was not hesitant. "If we find ourselves at the end of the season with 2 million subscribers, sure, there could be another $5 price increase. As to the future, it's hard to say." Well, not too hard, I'm sure.

However, these days GameDay Audio is just a side line. MLB has devised a product line-up to appeal to all levels of baseball addiction (see chart). New this year is *MLB.TV* which allows subscribers to watch live "out-of-market" games on your computer. You also get full game replays of games you might have missed. Cost is $15/month, but you'll need a 300 kilobit high speed connection. *Baseball's Best* lets you listen to vintage radio broadcasts from the '30s to the present. Even *GameDay Audio* has two levels: Follow all games by all teams $19.95/season or follow your favorite team for $9.95/season.

But wait, there's more! *MLB.COM BROADBAND* (300 kb required) offers the veritable cornucopia of baseball audio and video including: *PostgameTV* which lets you watch up to 15 specific game highlights every day; *Condensed Games* where you can watch all the highlights from all the games in a video package which lasts about 20 minutes; *Highlights Direct* where you choose which team highlights you'd like to see and they'll show up in your e-mail box; *Custom Cuts* which lets you look at any of the days highlights you want see; and *Press Pass* which sends the pregame media notes to your e-mail box. Yes, you get all that for just $19.95/month. Is anybody still actually working at their desks?



Back to the 20th Century

All the on-line action is fine, but it does have its limitations. For instance, it's certainly not portable, the audio is not necessarily where you want to be, it requires your computer to be running for hours, and it slows down any other on-line activities you may be doing.

That' means that there's still room for old-fashioned 20th Century style listening. You don't need anything fancy. A simple AM radio and the Radio Shack loop (RS# 15-1853) will let you listen in on games within a 250-500 mile radius.

A more effective system is to have a serious DX radio attached to a Beverage antenna. The Beverage can be a long wire only 6-8 feet off the ground running in a straight line in the direction of the target station. It should be at least 300 feet long to be effective; 1,500 feet to be really effective. If it's terminated at the end by a 400-600 ohm resister, it becomes unidirectional in the direction it's pointed. If not, it becomes bi-directional. The big advantage to the Beverage, besides being directional, is that they are much quieter antennas than higher mounted random wire or ham type multi-band dipoles. This is particularly important as the summer storm season gets under way.

In the end, tuning in via subscription to GameDay Audio will probably end up like satellite radio. For some it's the answer to a longtime frustration of poor radio reception and well worth the price. But, for most of us it's just another charge on something we were used to getting for free. Keep in mind that all prices quoted are for the *regular* season. The postseason is another game entirely.

MLB Flagship Stations

Team	Call Letters	Frequency (kHz)		
Anaheim Angels	KSPN	710	XPRS*	1090
Arizona Diamondbacks	KTAR	620	KSVN*	1400
Atlanta Braves	WSB	750	WWWE*	1100
Boston Red Sox	WEEI	850	WROL*	950
Chicago Cubs	WGN	720		
Chicago White Sox	WMVP	1000		
Cincinnati Reds	WLW	700		
Cleveland Indians	WTAM	1100		
Colorado Rockies	KOA	850		
Detroit Tigers	WXYT	1270		
Florida Marlins	WQAM	560	WQBA*	1140
Houston Astros	KTRH	740	KLAT*	1010
Kansas City Royals	KMBZ	980		
Los Angeles Dodgers	KFWB	980	KWKW*	1330
Milwaukee Brewers	WTMJ	620		
Minnesota Twins	WCCO	830		
Montreal Expos	CHUM	1050	CKAC (French)	730
New York Mets	WCBS	660	WADO*	1280
Oakland Athletics	KFRC	610		
Philadelphia Phillies	WPEN	950		
Pittsburgh Pirates	KDKA	1020		
San Diego Padres	KOGO	600	XEMO*	860
San Francisco Giants	KNBR	680	KZSF*	1370
Seattle Mariners	KOMO	1000	KKMO*	1360
St. Louis Cardinals	KMOX	1120		
Tampa Bay Devil Rays	WFLA	970		
Texas Rangers	KRLD	1080	KESS*	1270
Toronto Blue Jays	CJCL	590		

*Spanish Language Flagship

MLB.com Product Line-Up

GAMEDAY AUDIO	1) Listen to every game of your favorite team. $9.95/season 2) Listen to every game of every team. $19.95/season
MLB.TV	Watch live out-of-market games on your computer $14.95/month
BASEBALL'S BEST	Hear vintage radio & classic TV from the 30's to today $4.95/month
MLB RADIO	Listen 9-5 ET M-F to "the only all-baseball radio network" $9.95/season
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Ken Reitz, KS4ZR
kenreitz@monitoringtimes.com

ST9900 DVB FTA Satellite Receiver

Several times a year I take a look at what's happening in the world of C/Ku-band satellite TV reception. This time I'll take a look at the latest Digital Video Broadcast (DVB) satellite receiver from DVB Express, the ST9900, which I've had the opportunity to test. This DVB receiver is smaller than its predecessors, just 10 inches wide by 7-1/2 inches deep by only 2-1/4 inches high, and has even more features. As with most DVB receivers it is designed to receive only those channels which are broadcast in the DVB digital standard (the international standard used widely in Europe and Asia) which are not encrypted or are Free-To-Air (FTA).

There are dozens of channels on the broadcast satellites throughout our portion of the Clarke Belt which can be received using these simple receivers and a 10-foot standard C-band dish. The addition of a Ku-band LNB to the package allows even more channels to be seen. Below is a partial list of video and audio channels which can be seen from most parts of the U.S. There are separate charts for video and audio. I've included only those which are FTA and of interest to satellite TV DXers looking for foreign broadcasts and national network programming.

❖ What You Can and Can't Do

Most DVB FTA receivers such as the ST-9900 cannot receive analog, 4DTV, DISH Network or DirecTV channels. They can receive only DVB channels which are not encrypted. If you tune an encrypted channel with the ST-9900 you'll get a blank screen. There are no provisions for receiving encrypted channels, so if any of your favorite channels encrypt you'll be out of luck.

The ST-9900 cannot drive a dish or switch polarity so you'll have to configure the receiver as a "slave" to your current analog receiver which does have a dish drive and polarity switch. To set up as a slave receiver, simply take the LNB coax from the dish into the LNB IN fitting and take the LNB OUT to your analog receiver's input, just like a computer equipment "daisy chain." Take the RF out from the ST-9900 to your VCR or use the yellow RCA video plug out. Take the left/right audio out and put it into your stereo amplifier and run a length of fiber optic cable from the S/PDIF plug to your amplifier. Now you're set to tune in the world of DVB satellite TV.

❖ ST-9900 Features

Among the many standard DVB features on the ST-9900 are a well designed on-screen display of the menu driven navigation sequence for setting up channels and finding new ones. Using the small but efficient remote control, the steps are quite logical. Features on the remote control include an electronic program guide which makes it easy to call up an individual channel out of the hundred or more you may have programmed in; channel and volume up/down buttons; "audio" button which allows you to explore different audio services which may be on the same channel as program audio; and "menu" button which does the set-up navigating.

I've used many DVB FTA receivers over the years and this is the most sensitive I've used to date. It requires a minimal amount of signal to produce a crisp digital picture. On some channels I've had a signal quality as low as 15% still deliver great pictures and sound. This makes set-up very easy on satellites which may not have any analog channels.

Following the explicit instructions in the easy-to-read manual, you'll be able to lock in digital signals on both C and Ku-bands with little difficulty. If you're setting up the system using a "smart LNBF," the receiver takes all the guesswork out of finding and locking onto the strongest signal. There is a bright red LED on the LNBF which starts to blink as you acquire the satellite's signal. As you slowly move the dish into position it blinks faster. When you are locked dead onto the satellite it stops blinking entirely. This method makes it possible to do installations without having to run back and forth from the house or drag the receiver and a TV set outside.

90 cm offset feed Ku-band dish works very well with the ST-9900 and is available from DVB Express (Courtesy: DVB Express)

Both the video and audio quality are what we've all come to expect from compressed digital signals and you'll be quite surprised to hear the depth of the audio quality when tuning in some of the radio channels. You'll find the audio compares favorably to CD quality when played through your own stereo system.

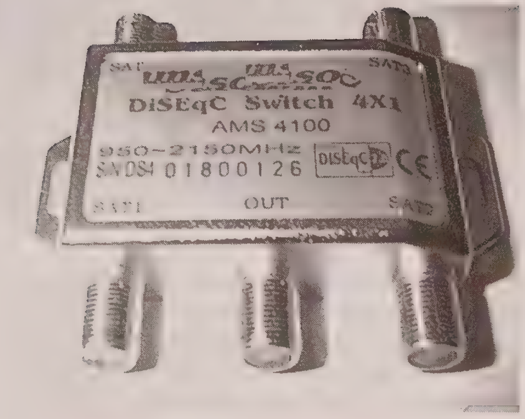
There are, however, several PBS channels on AMC-3 Ku-band which transmit their audio via Dolby® AC-3 imbedded in the data stream. No audio will be heard from your TV set. The only way it can be heard is by using the fiber optic connection mentioned earlier. The audio from these channels, particularly if you're watching a Pops concert or Austin City Limits is fantastic. It's worth the extra $10-15 for the cable!

The ST-9900 can store thousands of radio and TV channels, has the tuning parameters for more than 50 satellites already programmed in, and can be software updated through your computer by downloading upgrades via the Internet.

There are two things which you'll need to know when you set up your ST-9900: (1) If the unit fails to turn on you have to quickly unplug and replug the AC two times. The front display will show 8.8.8.8 then – running left to right. This is the reboot mode which I had to use twice over several months of operating. (2) When you are about to change something in the receiver's memory, you're presented with a password screen which shows four question marks. Press "0" four times. The question marks disappear and the sequence may continue. This is the default password.

❖ Bottom Line

I first started testing DVB FTA satellite receivers over five years ago. The technology has come a long way since then. There are also at least ten times the number of transmissions using DVB now. In fact, it has become somewhat of the broadcast industry standard for use in Satellite News Gathering (SNG) and sports backhauls, which used to be sent in the analog NTSC standard. The main reason for this is that it is much cheaper to use compressed video tech-



DiSEqC switch allows switching between two fixed dishes and is done automatically through the ST-9900 receiver. (Courtesy: DVB Express)

nology than analog.

Finding those unannounced transmissions was nearly impossible years ago, but the ST-9900 can do an automatic search for them. In addition, if a new channel or "bouquet" of channels becomes available, you can manually edit a transponder to include these new channels.

The place to find out about new DVB channels, which satellite and which transponder they're on, is at **http://www.lyngsat.com**. In fact, it's a good idea to bookmark that web site and check in daily to see what's happening. You'll also find out about analog channel changes as well. Keep in mind that the DVB FTA arena is very fluid and changes quite often. Also note that some channels which are normally encrypted sometimes operate in the clear. The Fox Sports Channel bouquets are a good example.

You can set the ST-9900 up as a standalone satellite receiving system if you're interested only in one satellite. This is how the bulk of DVB FTA systems are sold. Many Asian and Arabic families have them set up for specific channels because it may be the only way they can get news and programming from home in their own languages. You can also set up these receivers to use more than one small dish. If, for instance, you want to watch the programming on Telstar 5 and the PBS channels on AMC-3, you can set up two Ku-band dishes and simply switch between the two using a special switch (DiSEqC) which controls which LNBF feeds the receiver. This makes it so that you don't need a dish drive to turn the dish.

Keep in mind that FCC rules allow anyone anywhere to have a dish up to 1 meter in size for satellite TV reception. You can get excellent DVB FTA reception from a one meter Ku-band dish. DVB Express sells all manner of fixed and motorized Ku-band dishes, LNBFs, and assorted hardware.

The ST-9900 sells for $199 plus shipping and handling. The 90 cm (1 meter) Ku-band dish with Ku-band LNBF is $114 plus shipping. The DiSEqC switch is $25 plus shipping. All are available on-line from **http://www.dvbexpress.com** or by e-mail: *sales@MPEG2-DVB.COM* or by 24 hour order FAX line: 888-731-1834. Mail order only: P.O. Box 81811 Roche, MI 48308 Their guaranty information is at **http://store.yahoo.com/hightech/info.html**.

Table 1: DVB FTA TV Channels

Satellite/Transponder	*Location/Service*
Panamsat 9 58°W	
6	Zee TV Africa
8	CCTV 4 (China)
	CCTV 9 (China)
16	Deutsche Welle
	RTP (Portugal)
17	NHK World TV (Japan)
AMC-2 85°W	
22	USIA WorldNet
AMC-3 87°W	
7	Supercanal Caribe
24*	PBS East Feed+
	PBS West Feed+
	PBS Kids+
	PBS You+ (Continuing Ed.)
Telstar 5 97°W	
11*	EuroNews (English)
	EuroNews (German)
5, 7, 9, 21, 22, 23, 26, 27*	
	Numerous Arab & Asian Channels
AMC-4 101°W	
8	NBC East Coast Feed
AMC-1 103°W	
2	DW TV (Germany)
7	PAX-TV 3 Time Zone Feeds
Anik F1 107°W	
9	Meteo-Media (Weather Network French)
10	CTV Red Network (Canada)
	CTV Green Network
	CTV Blue Network
	NewsWorld International (CBC)
	The Weather Network (English)
SatMex5 116°W	
17	Tele Ritmo
	XHAWA Canal 12
20	Guatevision
Galaxy 10r 123°W	
1,9,11,13,19*	
	TARBS World TV (Numerous channels from Europe and Asia)
Telstar 7 129°W	
14	CNBC Europe

Table 2: DVB FTA Radio Stations

Satellite/Transponder	*Service*
Panamsat 9	
10	China Radio International
16	Deutsche Welle Radio 1
	DW Radio 2
	DW Radio 7
	RDP International (Portugal)
AMC-2	
22	VoA Music Mix
	VoA News Now
AMC-3	
17	Info Radio Net
	Moody Bible Radio 1, 2
	Focus on Family Radio 1,2,3,
	Salem Radio Network A, B, C
	Ambassador 1, 2
Telstar 5	
11	BYU Radio
	KSL-AM 1160 (Salt Lake City)
11*	DW 1
	Polskie Radio 1
27*	World Radio Network (English)
	World Radio Network (Multi-lingual)
	World Radio Network (French)
	Voice of Turkey
Anik F1	
9	British Forces Broadcasting Service
	CITE Rock Detante (Montreal)
	CKAC 730 AM (Montreal)
	La Magnetotheque (French Reading Service)
	Classical Music (No announcers)
AMC-1	
2	Deutsche Welle Radio 1
	DW Radio 2
	DW Radio 7
Galaxy 10r	
9, 11	Radio Italia
	Radio Greece

*Ku-band +Dolby® AC-3 Audio

It's discrete versus discreet

This month's feature article on becoming a "Frequency Detective" makes the use of both words "discrete" and "discreet." And no, they are not the same thing.

Discrete means distinct or separate. This would refer to frequencies which are individually assigned to a service or a particular location, as opposed to, say, a frequency which is part of a trunked system or frequencies in a certain spectrum range available to be used by a particular service.

It's also a common term in aviation, defined as "A separate radio frequency for use in direct pilot-controller communications in air traffic control which reduces frequency congestion by controlling the number of aircraft operating on a particular frequency at one time." (www.pilotsweb.com)

Discreet is an adjective which refers to maintaining "prudent silence" or to being cautious. Therefore, a discreet channel would be one picked for being unobtrusive.

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Getting Started

Ask Bob

Bob Grove, W8JHD
bobgrove@monitoringtimes.com

More on Accessory Interference

In our April column, a reader asked how it was possible for an electronic device which has been turned off to emit considerable radio interference. Geoff Gidman, KA1EPF, provides one answer.

A large percentage of modern electronic appliances are microprocessor controlled; even when the device is turned off, some power remains to allow the microprocessor to receive signals from the remote control to turn back on again. The clock circuit of a microprocessor is essentially a square-wave generator, rich in harmonics, operated at radio frequencies. Other hobbyists have learned that switching power supplies can emit considerable interference as well. Various external filters usually fail to offer much help since the interference may be radiated directly through the cabinet as well as attached cables.

One sure cure, however, is to unplug the devices from the wall; this virtually always shuts down the interference – as well as the accessory's capability to be turned back on by the remote control.

Perry Crabill, Jr., W3HQX, went even further, determining which frequencies and which accessories were causing the interference at his home.

He contacted Zenith Corporation to confirm that his model SJ-2065-W TV's switching power supply was emitting a signal at 36.96 kHz as well as several generations of harmonics clear into the shortwave spectrum. But it was still within tolerance as set by the FCC.

Additionally, his Sanyo VHR-3350 VCR was radiating a strong signal at 525 kHz along with harmonics, as was his AT&T model 5500 cordless phone at 300 kHz plus harmonics.

He also discovered radiation around 560 kHz coming from his Brother model 600 facsimile machine, and even weak harmonics from his old Kenwood R5000 communications receiver on harmonics of 17.56 kHz.

Perry's sense of humor came through with this final report: Desiring to listen to the VLF spectrum one evening, he unplugged all the offending household electronic accessories, plus the automatic night light which generates considerable broad-band noise, switched off the porch lights' solid-state timers, the fluorescent kitchen lights, and a humidifier control.

With great anticipation, he then switched on his radio and discovered that the natural atmospheric noise blanketed everything anyway! He turned off the radio, hooked up all the home accessories and went to bed.

Thanks, Geoff and Perry, for sharing your excellent insights.

Q. How can I quickly discharge NiCd batteries to avoid loss of maximum charge capability? (Roger Henderson, Memphis, TN)

A. Voltage suppression from overcharging a NiCd cell or battery is temporary, and as soon as the battery is discharged, it loses that suppression and recharges normally again. The issue of "memory" has been greatly exaggerated and is not a concern in modern NiCd chemistry.

You can rapidly discharge NiCd batteries by simply placing a resistance such as a light bulb of appropriate voltage across them. Panel bulbs (such as #47) are always safe, but the more powerful the bulb (like automotive bulbs), the heavier the current drain.

To be completely safe, choose a resistance or bulb that will discharge the batteries at approximately their maximum capacity in ampere hours (AH); this is printed on the battery. You can compute this using Ohm's law (resistance in ohms is equal to the voltage divided by the current in amps).

For example, if you have a six-volt battery and it's rated at 600 mAH (milliampere hours, that's the same a 0.6 AH). In other words, the safe discharge is 600 mA over a period of one hour. To choose a resistance that would discharge a 6V battery in one hour at 600 mA, you would simply divide 6 by 0.6 to get 10 ohms.

Use a multimeter to do this properly; you can measure the current that's being drained while you're performing the experiment. Just so long as the battery doesn't get hot to the touch (warm is OK), you're doing fine.

But a discharged battery does not mean drained of all charge, it means that the terminal voltage across each cell has dropped to no less than 1.0 volts from a fully-charged 1.25 volts. For rough calculation, figure about a 10% drop from the battery's rated voltage.

Q. I have a 50-ft wire antenna connected via coax to my shortwave radio; the shield is grounded to a pipe in the ground. Sometimes I get better reception with the ground connected, sometimes when it's not. Why is this? (Ben Crow, email)

A. Several possibilities include:

(1) Some signals may be arriving at a sharp angle favoring the end of the wire; the directivity (pattern) of the antenna may change when the ground is connected or disconnected;

(2) Ungrounding the coax shield makes it a vertical antenna element which will pick up those signals better than the end of the wire;

(3) Electrical interference may hinder reception; grounding or ungrounding the shield is likely to change the interference levels at certain frequencies;

(4) Strong-signal overload of your receiver can block weak-signal reception; a slight reduction in those strong signals may result from the change in grounding;

(5) Depending upon the length of the coax and how it's connected to your wire antenna, it may behave as an extended dipole element when ungrounded, increasing signal strengths.

Q. How should I store my phonograph records, vertically or horizontally? (Mark Burns, Terre Haute, IN)

A. Most collectors recommend vertically, just as was done with commercial cabinets and racks in the early phono days. Just don't store them leaning at an angle; this will produce warping in vinyl LPs and 45s, and invite cracking in the old shellac 78s.

Heat is another warp-inducing enemy of records, and moisture invites mold. Store them in a cool or moderate, dry place with circulating air, like the living space in your home.

Q. One of my friends drives a truck with a single, 3 x 6 inch antenna mount supporting all the antennas – cell-phone, CB radio, scanner, XM satellite radio, low-band business, and even TV. Isn't this detrimental to the equipment? (R. Graves, email)

A. Chances are that he would have blown one of the receivers by now if the transmit level was high enough to be injurious, but there's no question that such a close assemblage of whips degrades both reception and transmission. Antennas in the same plane need to be separated by more than 1/4 wavelength at the lowest frequency of use to avoid interaction which changes the radiation pattern as well as raises the SWR.

Questions or tips sent to Ask Bob, c/o MT are printed in this column as space permits. If you desire a prompt, personal reply, mail your questions along with a self-addressed stamped envelope (no telephone calls, please) in care of MT, or e-mail to bobgrove@monitoringtimes.com. (Please include your name and address.) The current Ask Bob is now online at our website: http://www.monitoringtimes.com

Getting Started

Bright Ideas

Gary Webbenhurst
P. O. Box 344, Colbert, WA 99005-0344
garywebbenhurst@monitoringtimes.com

46 Thinking about getting your technician class ham license? The current pool of questions expires on June 30th. The new group of questions is much longer, and undoubtedly harder. Get moving! You can probably find the technician class book at Radio Shack on clearance for $2.97. After July 1st, there will be a new book with the new questions available. Be sure to get the correct book!

47 The SEAPAC ham radio convention in Seaside, Oregon, happens from June 13-15. Check their website at : **http://www.seapac.org/**. I have a habit of always buying a new radio at this event. The good news is that with several dealers present, the competitive cost savings is substantial. The savings does not pay for all my travel expenses, but it is a nice offset. Oh yeah, there is no sales taxes in Oregon. Another eight percent saved!

My SOP for all ham conventions: I carry a backpack to put all those paper handouts, brochures, and small purchases. When the doors open, the first thing I do is check the private sellers. Any good deals go quickly. Bring cash, as most won't take checks or credit cards. After scouring the private vendors, I go to the manufacture's displays for any free goodies and literature on current and new equipment. I have a large binder at home with all the literature on the many rigs I have owned over the years. Sort of my photo album of old friends.

There are many seminars offered: I always find a couple that sound interesting. I usually meet some friends at the convention. To keep in contact, we set our radios for a UHF splinter frequency, then select a digital squelch code, and the bell pager (ringer) feature. That way, we never miss a call, and hear only from our group members. Earphones are a must. Sounds a little snobbish, but it works well for our purpose. My Scout Frequency Finder goes nuts at these events and logs hundreds of frequencies in use. This is the best time to use a small stubby antenna. Anything else might get snagged in the crowd of people, or overwhelmed by the RF signals.

Not one to relax, I spend the down time listening in to the local public safety frequencies. Here are few:

Astoria FD 154.265 154.325
Seaside FD 154.385 158.760
Tillamook Sheriff 154.725 155.490
F-1 Clatsop Sheriff 155.790
(also Seaside PD)
F-2 Oregon State Patrol 154.860
F-3 Cannon Beach PD 155.550
F-4 Police Tactical 155.130
F-5 Cannon Beach 158.805

48 Radio Shack gets mentioned often in this column, because for many of us they are the easiest, and perhaps the only option for buying small items. Well, the price of these small items, particularly connectors, adapters, coax fittings, jacks and the like, seems to have soared. What are our options? If you rarely need such items, it is probably not worth changing your shopping habits. But, for those of us that always seem to need such items, they are often sold in bulk at ham swaps without the fancy packaging. There are also some catalog and internet sites. You can always share the cost with your radio friends. At SEAPAC, one of the items on my list is to grab a few handfuls of these items.

A final note on RS. I found their 2002 catalog while cleaning out a drawer. They no longer publish a catalog, making this one a collector's keeper. I can always look-up the stock # of something, and give them a call to see if they have it in stock before I drive all the way down there. From Radio Ranch, it's a twenty mile drive, one way.

49 While on road trips, I often visit the Interstate truck stops for fuel and food. Be sure to check out their store, as they usually carry a wide variety of radio antennas, connectors, and electrical parts. Don't forget the DOT Haz Mat books, map holders etc. I use maps to confirm the locations I hear mentioned on the monitored frequencies. My trip to SEAPAC is yet another shopping opportunity!

50 There is still another radio monitoring opportunity I use when I travel. I try to simulate a First Responder/Public Service/ARES callout. When I arrive, I set up my "station." I get out the office supplies, radio gear, power sources, and start monitoring the local ham and public safety frequencies. Do I have everything I need? I think I finally have it down to a science. It is good practice.

51 Don't forget to monitor, visit, or participate in the ARRL-sponsored Field Day. This year the overnight experience is June 28-29th. Need to find your local ham club? Visit **http://www.arrl.org/FandES/field/club/clubsearch.phtml**
While you are in the neighborhood, check out the Field Day 2003 clothing apparel at **http://www.arrl.org/news/stories/2003/02/13/1/?nc=1**

52 I stumbled upon a gem at my local auto parts store. Coleman™, the camping folks, have a new product called the Powermate. The heart of this beast is an 18 amp hour 12 volt battery. Now *that* will run your radio for awhile. It also comes with attached jumper cables, an air compressor, and two work lights. There are also two12 volt outlet holes. At $50, I couldn't pass it up. It is amazingly light and compact. It will stay in my van forever. *See Photo*

Coleman
Powermate
Jumpstart System

53 The new buzz in the ham radio community is the ability to link repeaters or home stations to the internet, and thus a huge network of other repeaters around the globe. These stations are assigned a number, and you can dial up any other station in the world. There are several excellent articles in the April edition of *CQ* magazine. Website is **http://www.echolink.org/el/.**

Note, this requires a computer, an interface between the radio and the computer's sound card, and connecting cables. Just as Kenwood leads the way with APRS, Yaesu is blazing a trail with their WIRES™ hardware and software. Visit http://www.vxstd.com/en/wiresinfo-en/faq.html or **http://www.universal-radio.com/catalog/fm_txvrs/13350890.html.** Their new VX-7R has a feature for easy use of the new links. Of course, you can use any brand of radio.

You must be a licensed amateur radio operator to participate in this new mode. But can FRS use of the technology be far behind? I shudder to think about the technology I will be mentioning in the 2004 columns!

Keep listening or you will miss the big one! Get out your shorts and sunglasses, vacation time is here!

Scanning Report

The World Above 30 MHz

Robert Wyman
robertwyman@monitoringtimes.com

My Head Hurts from Gigahertz!

We're now way above 30 MHz! Last month's column looked at the emerging public safety radio spectrum near 5 GHz (5000 MHz) and the potential for future voice and data radio networks. This month we'll look at other uses in the gigahertz range, plus see the FCC's take on wireless data and video services.

❖ Advanced Wireless Services

Take a deep breath before continuing. All right then: "Advanced Wireless Services is the collective term we use for new and innovative fixed and mobile terrestrial wireless applications using bandwidth that is sufficient for the provision of a variety of applications, including those using voice and data (such as internet browsing, message services, and full-motion video) content." *Source: FCC*

The FCC's unmistakable phraseology simply means the future is wireless, and wireless applications will go far beyond the voice communications we've experienced since the birth of two-way radio.

Data transmitted over radio, of course, has also been around for years. One may even say that Morse Code was the first data transmission over wired and wireless networks. More recent data streams include fax messages, remote credit card transactions, mobile database queries (such as mobile terminals in police cars), inventory control systems, automatic vehicle location systems, paging, air traffic control systems, wireless e-mail and messaging, and specialized telemetry including biometrics (transmission from sensors monitoring bodily functions) and telematics (transmission from sensors monitoring mechanical and electrical devices).

The future will bring a multimedia content of voice, data, photos, video, remote control and other functions to portable wireless devices. What about "cellular" phones, including original cellular systems in the 800 MHz range, plus newer-technology systems in higher bands? The FCC knows that Advanced Wireless Services (AWS) appear to merge with features proposed for wireless telephone networks. This presents a dilemma, since manufacturers and service providers of two-way radio equipment are not necessarily the same groups providing wireless telephone networks.

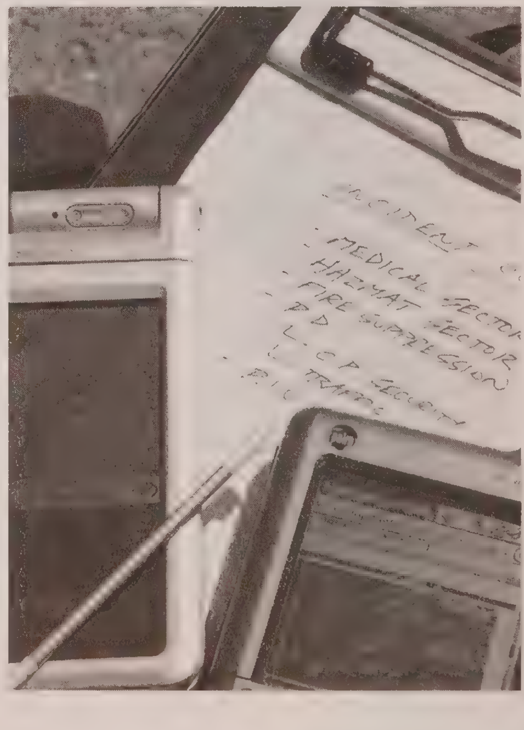
Take another deep breath, then proceed: "Although AWS is commonly associated with so-called third generation (3G) applications and has been predicted to build on the success of such current-generation commercial wireless services as cellular and Broadband PCS, the services ultimately provided by AWS licensees are only limited by the fixed and mobile designation of the spectrum we allocate for AWS and the service rules we ultimately adopt for the bands." *Source: FCC*

In other words, AWS will evolve into whatever the FCC and the marketplace dictate. This open-ended strategy is actually quite brilliant: AWS will provide anything that may be needed in the years ahead. It may compete with other wireless services, or provide supplemental connectivity, or provide unique and exclusive content.

Here's a rundown of key gigahertz allocations under currently-approved plans:

AWS: Advanced Wireless Service
MSS: Mobile-Satellite Service
MDS: Multipoint Distribution Service
PCS: Personal Communications Service
UPCS: Unlicensed Personal Communications Service

960-1240 MHz	Aeronautical Radionavigation, Radiolocation
1240-1300	Radiolocation, Amateur
1300-1350	Aeronautical Radionavigation
1350-1390	Fixed Mobile Radiolocation
1390-1395	Fixed Mobile, Fixed Satellite
1395-1400	Land Mobile
1400-1427	Radio Astronomy
1427-1432	Land Mobile, Telemetry, Satellite
1432-1435	Fixed Mobile
1435-1525	Aeronautical Telemetry
1525-1559	MSS L-Band (downlink), Aeronautical Telemetry
1559-1610	Aeronautical Radionavigation, Satellite
1610-1626.5	MSS "Big LEO" band (Low Earth Orbit; uplink)
1626.5-1660.5	MSS L-Band (uplink)
1660.5-1670	Radio Astronomy, Meteorological Aids
1670-1675	Fixed Mobile
1675-1710	Meteorological Aids, Satellite
1710-1755	AWS candidate spectrum; formerly a Federal Gov't. allocation
1755-1850	Federal Gov't. Fixed Mobile current allocation
1850-1910	PCS current allocation
1910-1920	UPCS current allocation, being reviewed for complete or partial redesignation toward Broadband PCS, AWS or other services
1920-1930	UPCS current allocation, also under review
1930-1990	PCS current allocation
1990-2025	MSS current allocation (uplinks)
1990-2000	Reallocation to fixed and mobile services
2000-2020	MSS remaining spectrum
2020-2025	Reallocation to fixed and mobile services; AWS candidate spectrum
2025-2110	Space Operation, Fixed, Mobile, TV, Cable TV use
2110-2150	AWS candidate spectrum; formerly a fixed microwave services allocation
2150-2155	AWS candidate spectrum; formerly MDS
2155-2160	MDS current allocation; AWS candidate spectrum
2160-2165	Fixed microwave current allocation; AWS candidate spectrum
2165-2200	MSS current allocation (downlinks)
2165-2180	Reallocation to fixed and mobile services
2180-2200	MSS remaining spectrum
2200-2300	Space Operation, Fixed Mobile
2300-2305	Amateur
2305-2390	Fixed, Mobile, Radiolocation, Broadcasting Satellite
2390-2400	UPCS current allocation, under review for reallocation
2400-2483.5	Amateur, RF devices, ISM equipment (Industrial/Scientific/Medical), Fixed Mobile



2483.5-2500	MSS "Big LEO" band (Low Earth Orbit; downlink)
2500-2690	Instructional Television Fixed Services (ITFS) and Multichannel Multipoint Distribution Services (MMDS) current allocations; under review for reallocation
2690-2900	Radio Astronomy, Aeronautical Radionavigation, Meteorological Aids, Radiolocation
2900-3100	Maritime Radionavigation
3100-3700	Radiolocation, Aeronautical Radiolocation, Fixed Satellite, Mobile
3700-4200	Fixed Satellite
4200-4400	Aeronautical Radionavigation
4400-4990	Fixed Mobile, Fixed Satellite
4990-5000	Radio Astronomy

❖ Don't Abandon VHF and UHF Just Yet

As we've discussed briefly in previous columns this year, the VHF and UHF bands should not be forgotten. In fact, these bands are seeing renewed licensing and channelization as 800 MHz bands are being filled. This means that some local agencies and businesses have come full circle over the last 10-20 years. First, they abandoned old VHF and UHF systems in favor of newer 800 MHz technologies. Now, they're returning to these bands, using even newer technologies and equipment.

For the 150-174 MHz and 421-512 MHz bands, the FCC has mandated that all equipment using these bands be capable of 12.5 kHz channelization instead of the historic 25 kHz channel spacing. To ease the transition from older equipment to newer models, a schedule has been established for all manufacturers and users:

...After January 1st, 2005, new VHF and UHF equipment must include narrow-band channels (with 25 kHz operation still allowed for backward compatibility).

...No new radios capable of operating on a 25 kHz channel will be allowed after January 1st, 2008.

...Non-public safety radio systems must be fully operational on 12.5 kHz channels by January 1st, 2013.

...Public safety radio systems must be fully operational on 12.5 kHz channels by January 1st, 2018.

...6.25 kHz channelization is also being reviewed for future mandates.

So, scanner manufacturers have plenty of time to respond to this change, although many public safety agencies are already buying and using the new 12.5 kHz channels.

For more information, visit the FCC's "Online Table of Frequency Allocations." This nearly 200-page document is an up-to-date repository of Commission rulings and spectrum usage notes. The document is in Adobe PDF format and is downloadable for those wishing to conduct their research offline: http://www.fcc.gov/oet/spectrum/table/fcctable.pdf

❖ Bank Number One: GA DOC

Our own Larry Van Horn contributes a single frequency with an important use: the Georgia State Department of Corrections. Larry writes, "These folks use 153.740 MHz, simplex, statewide for this network. Both base and mobiles operate here. Here is a list of all the known stations in this network."

153.7400 Georgia Department of Corrections dispatch (simplex)

Callsign	City	County	Facility
KT2449	Statewide Mobile		
KT7566	DOAS-DOR		
KUQ697	Hardwick	Baldwin	Baldwin State Prison
KMJ912	Macon	Bibb	Central State Prison
WPBR991	Macon	Bibb	Macon Diversion Center
KUQ698	Jackson	Butts	Diagonostic/Classification Prison Jackson
WNXE573	Morgan	Calhoun	Calhoun State Prison
WPMN659	Folkston	Charlton	Charlton Correctional Center
WQU402	Garden City	Chatham	Coastal State Prison
WPMK769	Savannah	Chatham	Savannah Transitional Center
WPBP928	Summerville	Chattooga	Hays State Prison
WNSF360	Athens	Clarke	Athens Diversion Center
WPDV532	Lovejoy	Clayton	Clayton CCI
WPAC573	Homerville	Clinch	Homerville PBC
WPLR548	Marietta	Cobb	Cobb Diversion Center
WPMV605	Nicholls	Coffee	Coffee Correctional Facility
WNQI898	Moultrie	Colquitt	SW Probation Detention Center
KNHM919	Bainbridge	Decatur	Bainbridge PSATC
KNBU634	Chester	Dodge	Dodge State Prison
WNWD842	Unadilla	Dooly	Dooly State Prison
WNUF784	Albany	Dougherty	Albany Transition Center
WPFU942	Twin City	Emanuel	Emanuel PDC
WNPZ500	Claxton	Evans	Southeast PDC
WNXS521	Rome	Floyd	Rome Diversion Center
KNDE656	Atlanta	Fulton	Central Office
KZB346	Atlanta	Fulton	DOAS Sec of State
WQS298	Atlanta	Fulton	Metro State Prison
WNVR972	College Park	Fulton	J..C. Larmore PDC
KUQ695	Buford	Gwinnett	Phillips State Prison
KUQ694	Alto	Habersham	Arrendlae State Prison
WPCG536	Gainesville	Hall	Gainesville Diversion Center
WNVK318	Sparta	Hancock	Hancock State Prison
KNNR482	Bremen	Haralson	West Georgia Probation Boot Camp
WNQN303	Hartwell	Hart	Whitworth PDC
WPPX906	Perry	Houston	Houston County PDC
WPUC767	Ocilla	Irwin	Irwin County PRC
WNQD938	Jefferson	Jackson	Davis PDC
WNWH870	Wrightsville	Johnson	Johnson State Prison
WPFS742	Lakeland	Lanier	Patten PDC
WNPZ503	Cadwell	Laurens	Central PDC
KUQ699	Leesburg	Lee	Lee State Prison
KUQ703	Valdosta	Lowndes	Valdosta State Prison
WPBA839	Oglethorpe	Macon	Macon State Prison
WPFS741	Pelham	Mitchell	Autry State Prison
WNGN936	Forsyth	Monroe	Burruss CTC
KNHW503	Mount Vernon	Montgomery	Montgomery State Prison
KZO492	Columbus	Muscogee	Rutledge State Prison
WPPX905	Dallas	Paulding	Paulding County PDC
WNSV922	Zebulon	Pike	West Central State Prison
WNST795	Cedartown	Polk	Northwest PDC
WPAN599	Hawkinsville	Pulaski	Pulaski State Prison
KUQ696	Eatonton	Putnam	Putnam State Prison
WPUJ889	Augusta	Richmond	Augusta Transition Center
KNCZ251	Grovetown	Richmond	Augusta State Med Prison
WNST807	Conyers	Rockdale	Rockdale/dekalb PDC
WPBM350	Glennville	Tattnall	Smith State Prison
KUQ702	Reidsville	Tattnall	GTA DOC Reidsville
WNQD937	Butler	Taylor	Western PDC
WNQF476	Milan	Telfair	Milan State Prison
WNVZ772	Helena	Telfair	Telfair State Prison
WPTS568	Dawson	Terrell	Terrell PDC
WNQE721	Lyons	Toombs	Central Farm Services
WNVC392	Soperton	Treutlen	Treutlen PBC
WNQI903	Blairsville	Union	Colwell PDC
KUQ692	Lafayette	Walker	Walker State Prison
WPLR217	Monroe	Walton	Alcovy Diversion Center
KUQ704	Waycross	Ware	Ware State Prison
WPMD537	Waycross	Ware	Waycross Diversion Center
WNXC590	Davisboro	Washington	Washington State Prison
KUQ701	Odum	Wayne	Wayne State Prison
WPMV463	Alamo	Wheeler	Wheeler Correctional Facility
WNXE569	Abbeville	Wilcox	Wilcox State Prison

CCI=County Camp Institutions
DOAS=Department of Administrative Services
DOR=Department of Revenue
PBC=Prison Boot Camps
PDC=Probation Detention Centers

Scanning Canada

John David Corby, VA3KOT
johncorby@monitoringtimes.com

Digital Police Special

There is no stopping it; Canada's emergency services are increasingly turning to digital radio systems for reliability, security and economy. Emergency service agencies are pooling resources and buying into this new technology in a big way. If your interest in the hobby centers around monitoring the police, you may be faced with a further big investment in equipment and some hurdles to jump before you can get around the loss of monitoring targets that this trend entails. For some groups, such as tow truck operators and the media, there is no choice. General scanning hobbyists may find this a tougher pill to swallow – and there is more than just money involved.

ScanCan has received a number of readers' e-mails inquiring about Canadian licensing requirements for the new digital scanners. Information is still sketchy and hard to get, but the situation seems to be that retailers are permitted to sell digital scanners – such as the Uniden Bearcat BC250D and BC785D – to licensed amateur radio operators and commercial organizations who hold a license from Industry Canada.

In the case of amateur radio operators, it is necessary to declare that the use is for amateur radio activity only. This is a little ironic since *ScanCan* does not know of any APCO-25 amateur radio repeaters in Canada. Of course we Canadian hams are equipping our stations for possible future introduction of digital repeaters – or maybe just for operating simplex.

Commercial users must apply using an application form that is not specifically designed for digital receivers. This may indicate that Industry Canada has not invested too much time on a regulatory exercise they either do not particularly believe is valuable, or which may not have high expectation of longevity. We live in hope.

While the licensing requirements are a little hard to find on government websites, the technical requirements are contained in Industry Canada's document RSS-135. This document, first published in 1996, references the fact that digital scanner receivers require a license, but goes on to give a street address and telephone number for inquiries instead of an e-mail or website reference. Type approval (which has been granted to the BC250D and BC785D) requires that a label be affixed to the receiver indicating the need for a license to own the device.

RSS-135 is a slim document that deals mainly with spurious emissions. It is not Industry Canada's intention to dictate the design specifications, but rather to protect the spectrum from interference caused by badly made electronic devices.

In any event, the Bearcats are available at several Canadian retailers (for a hefty price), subject to the restrictions noted. Perhaps this minor inconvenience will spur more scanner owners to invest a little of their time studying for the Canadian amateur radio basic license. And just in case the tuning knob should slip a little off frequency for amateur radio activity, there is a growing list of utility operators creating APCO-25 "QRM" (man-made interference) in Canada.

❖ Who is Going Digital?

ScanCan predicts that within a few years the majority of Canada's public utilities will be using digital communications. For now, there are specific areas that have already adopted the technology, or are immersed in a digital conversion project. One of the earliest adopters is the Victoria, BC, area with a project called "CREST" (Capital Region Emergency Service Telecommunications). CREST uses Motorola technology (as do most other systems researched by *ScanCan*) and will link nearly all of the police, fire and ambulance services in the Victoria area. CREST is targeted for completion by the time this issue of *MT* hits the streets.

As reported in *Scanning Canada* in March this year, Industry Canada has announced a similar move for most of Ontario. Once again a Motorola-based APCO-25 system will be installed over 15 years, providing a common technology platform for all the emergency services agencies in Canada's most heavily populated province. Police in some communities such as Barrie, Sarnia, Sault Ste. Marie, London, and Durham Region have already converted, according to published reports.

The City of Calgary, Alberta, has also gone almost entirely digital for all police, fire and ambulance services, and the entire island of Montreal is following suit.

The federal government's Department of National Defence has also included APCO-25 compliance in its communications specifications for the replacement of Canada's embarrassingly old and unreliable Sea King helicopter fleet. *ScanCan* will refrain from potentially tasteless jokes pointed at the fed's mishandling of this situation. Suffice it to say that our nation's present helicopter fleet (while it lasts) may be a lot easier to monitor – and oh so exciting, too.

Canada's police forces are going digital.

Finally, the following communities around the country are believed to still be using emergency services frequencies that you can monitor with a good old fashioned analog scanner. Reader corrections, updates and monitoring reports are most welcome. The following is a selection of VHF police frequencies from around the country, but catch them while you can: the times they are a'changing.

VHF Analog Police Frequencies

BC Rail Police	140.050 141.420
Orangeville, ON	142.83
Aylmer, ON (Police College)	149.440
Carnavon, ON	151.055, 151.070 151.085 151.100 151.115 151.580
Hanover, ON	151.160 153.215
Richmond Hill, ON	152.435 154.725
Ballantrae, ON	153.665
Fredericton, NB - Univ. campus police	153.425
Berwick, NS	153.770 154.040
Province of BC	154.250 155.460
Lower Mainland & Vancouver Is, BC	154.740
Trenton, NS	154.620 155.100
Aurora, ON	154.070
The Half Way, MB	154.040 154.400 155.670
Morden, MB	154.265
Harbour Master's Office (Police) St. John's, NF Port Authority	155.760 156.550
Nitinaht, BC	140.140 155.955
Toronto, ON, Rees St Police Stn (Toronto Port Authority)	156.500 156.600 156.700 156.800 157.100

Next month *Scanning Canada* will examine what direction our hobby will take when Canada goes digital from the Pacific to the Atlantic to the Arctic. Until then, happy (analog) frequency hunting.

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CEI on-line or phone special price $339.95

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Bearcat® 895XLT Trunk Tracker

Manufacturer suggested list price $499.95

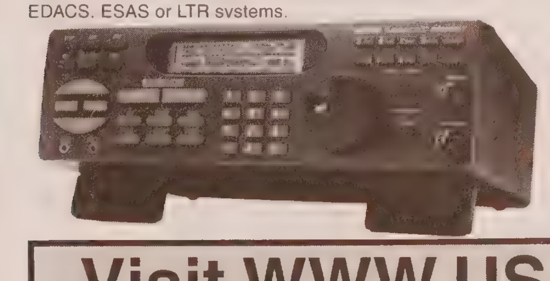
Less -$320 Instant Rebate / Special $179.95

300 Channels • 10 banks • Built-in CTCSS • S Meter

Size: $10^{1/2}$" Wide x $7^{1/2}$" Deep x $3^{3/8}$" High

Frequency Coverage: 29.000-54.000 MHz., 108.000-174 MHz., 216.000-512.000 MHz., 806.000-823.995 MHz., 849.0125-868.995 MHz., 894.0125-956.000 MHz.

The Bearcat 895XLT is superb for intercepting trunked analog communications transmissions with features like TurboScan™ to search VHF channels at 100 steps per second. This base and mobile scanner is also ideal for intelligence professionals because it has a Signal Strength Meter, RS232C Port to allow computer-control of your scanner via optional hardware and 30 trunking channel indicator annunciators to show you real-time trunking activity for an entire trunking system. Other features include Auto Store - Automatically stores all active frequencies within the specified bank(s). Auto Recording - Lets you record channel activity from the scanner onto a tape recorder. CTCSS Tone Board (Continuous Tone Control Squelch System) allows the squelch to be broken during scanning only when a correct CTCSS tone is received. For maximum scanning pleasure, order the following optional accessories: **PS001** Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter $14.95; **PS002** DC power cord - enables permanent operation from your vehicle fuse box $14.95; **MB001** Mobile mounting bracket $14.95; **EX711** External speaker with mounting bracket & 10 feet of cable with plug attached $19.95. **CAT895** Computer serial cable $29.95. The BC895XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO, EDACS, ESAS or LTR systems.



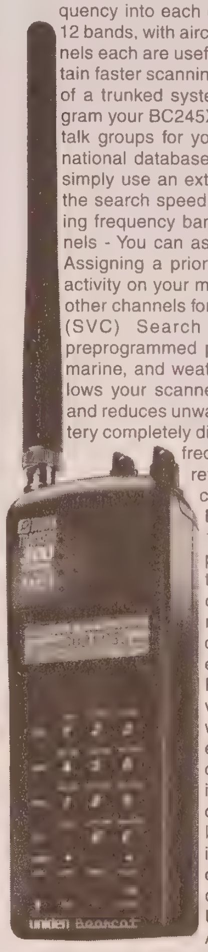
Bearcat® 245XLT Trunk Tracker II

Mfg. suggested list price $429.95/**CEI price $189.95**

300 Channels • 10 banks • Trunk Scan and Scan Lists
Trunk Lockout • Trunk Delay • Cloning Capability
10 Priority Channels • Programmed Service Search

Size: $2^{1/2}$" Wide x $1^{3/4}$" Deep x 6" High

Frequency Coverage:
29.000-54,000 MHz., 108-174 MHz., 406-512 MHz., 806-823.995 MHz., 849.0125-868.995 MHz., 894.0125-956.000 MHz.



Our Bearcat TrunkTracker BC245XLT is the world's first scanner designed to track Motorola Type I, Type II, Hybrid, SMARTNET, PRIVACY PLUS and EDACS® analog trunking systems on any band. Now, follow UHF High Band, UHF 800/900 MHz trunked public safety and public service systems just as if conventional two-way communications were used. Our scanner offers many new benefits such as Multi-Track - Track more than one trunking system at a time and scan conventional and trunked systems at the same time. 300 Channels - Program one frequency into each channel. 12 Bands, 10 Banks - Includes 12 bands, with aircraft and 800 MHz. 10 banks with 30 channels each are useful for storing similar frequencies to maintain faster scanning cycles or for storing all the frequencies of a trunked system. Smart Scanner - Automatically program your BC245XLT with all the frequencies and trunking talk groups for your local area by accessing the Bearcat national database with your PC. If you do not have a PC simply use an external modem. Turbo Search - Increases the search speed to 300 steps per second when monitoring frequency bands with 5 KHz. steps. 10 Priority Channels - You can assign one priority channel in each bank. Assigning a priority channel allows you to keep track of activity on your most important channels while monitoring other channels for transmissions. Preprogrammed Service (SVC) Search - Allows you to toggle through preprogrammed police, fire/emergency, railroad, aircraft, marine, and weather frequencies. Unique Data Skip - Allows your scanner to skip unwanted data transmissions and reduces unwanted birdies. Memory Backup - If the battery completely discharges or if power is disconnected, the frequencies programmed in your scanner are retained in memory. Manual Channel Access - Go directly to any channel. LCD Back Light - An LCD light remains on for 15 seconds when the back light key is pressed. Autolight - Automatically turns the backlight on when your scanner stops on a transmission. Battery Save - In manual mode, the BC245XLT automatically reduces its power requirements to extend the battery's charge. Attenuator - Reduces the signal strength to help prevent signal overload. The BC245XLT also works as a conventional scanner. Now it's easy to continuously monitor many radio conversations even though the message is switching frequencies. The BC245XLT comes with AC adapter, one rechargeable long life ni-cad battery pack, belt clip, flexible rubber antenna, earphone, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO, ESAS or LTR systems.

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Bearcat 785D 1,000 channel Trunktracker III base/mobile........	$339.95
Bearcat BCi25D APCO Project 25 digital software card.........	$299.95
Bearcat 278CLT 100 ch. AM/FM/SAME WX alert scanner.......	$139.95
Bearcat 250D 1,000 ch. Trunktracker III handheld scanner....	$339.95
Bearcat 245XLT 300 ch. Trunktracker II handheld scanner....	$189.95
Bearcat 248CLT 50 ch. base AM/FM/weather alert scanner.......	$84.95
Bearcat Sportcat 200 alpha handheld sports scanner.............	$159.95
Bearcat Sportcat 180B handheld sports scanner.....................	$139.95
Bearcat 80XLT 50 channel handheld scanner............................	$99.95
Bearcat 60XLT 30 channel handheld scanner............................	$74.95
Bearcat BCT7 information mobile scanner..............................	$139.95
AOR AR16BQ Wide Band scanner with quick charger.............	$199.95
Sangean ATS909 306 memory shortwave receiver..................	$209.95
Sangean ATS818 45 memory shortwave receiver.................	$139.95
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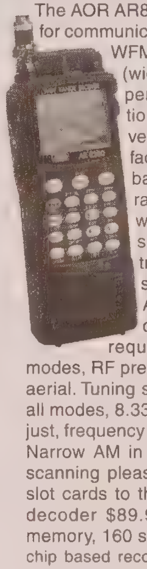
AOR8200 Mark IIB-A wideband handheld scanner/**SPECIAL $539.95**

1,000 Channels • 20 banks • 50 Select Scan Channels
PASS channels: 50 per search bank + 50 for VFO search
Frequency step programmable in multiples of 50 Hz.

Size: $2^{1/2}$" Wide x $1^{3/8}$" Deep x $6^{1/8}$" High

Frequency Coverage:
500 KHz to 823.995 MHz, 849.0125-868.995 MHz, 894.0125-2,040.000 MHz
(Full coverage receivers available for export and FCC approved users.)



The AOR AR8200 Mark IIB is the ideal handheld radio scanner for communications professionals. It features all mode receive: WFM, NFM, SFM (Super Narrow FM), WAM, AM, NAM (wide, standard, narrow AM), USB, LSB & CW. Super narrow FM plus Wide and Narrow AM in addition to the standard modes. The AR8200 also has a versatile multifunctional band scope with save trace facility, twin frequency readout with bar signal meter, battery save feature with battery low legend, separate controls for volume and squelch, arrow four way side rocker with separate main tuning dial, user selectable keypad beep/illumination and LCD contrast, write protect and keypad lock, programmable scan and search including LINK, FREE, DELAY, AUDIO, LEVEL, MODE, computer socket fitted for control, clone and record, Flash-ROM no battery required memory, true carrier reinsertion in SSB modes, RF preselection of mid VHF bands, Detachable MW bar aerial. Tuning steps are programmable in multiples of 50 Hz in all modes, 8.33 KHz airband step correctly supported, Step-adjust, frequency offset, AFC, Noise limited & attenuator, Wide and Narrow AM in addition to the standard modes. For maximum scanning pleasure, you can add one of the following optional slot cards to this scanner: **CT8200** CTCSS squelch & search decoder $89.95; **EM8200** External 4,000 channel backup memory, 160 search banks. $69.95; **RU8200** about 20 seconds chip based recording and playback $69.95; **TE8200** 256 step tone eliminator $59.95. In addition, two leads are available for use with the option socket. **CC8200A** personal computer control lead $109.95; **CR8200** tape recording lead $59.95. Includes 4 1,000 mAh AA ni-cad batteries, charger, cigarette lighter adapter, whip aerial, MW bar antenna, belt hook, strap and one year limited AOR warranty. For fastest delivery, enter your order on-line at http://www.usascan.com.

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Utilities in the Gulf

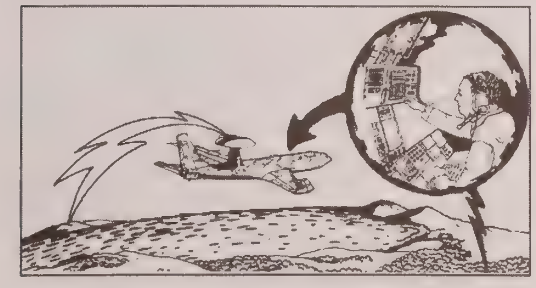
As explained last month in the *Milcom* column, reports of military radio communications from the Persian Gulf have been sparse. Even so, here are a few thoughts, now that another month has passed.

Air-ground phone patches

High-frequency (HF) aeronautical radio continues to be heavily used by United States military aircraft. These are mostly transports and tankers. They phone ahead to make routine arrival arrangements, or to find out what the weather will be when they land.

In the 1991 Gulf War, US Air Force phone patch capabilities were strained past the breaking point. More than once, aircraft faced long waits for their turn to work the ground station.

Of course, the Air Force has completely revamped its radio system twice since then. First time was the combining of assets from GCCS (Global Command and Control System) and the old strategic GIANT TALK net into what became the Global High Frequency System (GHFS). The second change is still going on, creating the High Frequency Global Communications System, (HF-GCS) and the completely new Automatic Link Establishment (ALE) network. Meanwhile, the Internet and several military networks using the same type of technology have combined to increase the bandwidth available for world communication by many orders of magnitude.



Given all these upgrades, it came as a bit of a surprise starting last year when much of the increased phone patch load went to what is actually one of the oldest networks. This is, of course, the US Air Force branch of the quasi-amateur Military Affiliate Radio System (MARS).

Not all that long ago, even MARS itself considered the phone patch mission obsolete, preferring to stress national security and emergency preparedness (NS/EP). Well, radio invariably tends to surprise people.

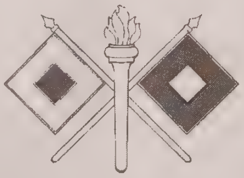
Busiest channels at press time are 4557, 11407, 13927, 14408, 14606, and the weekly administrative net on 13977. All frequencies are in kilohertz (kHz), upper sideband (USB), and represent the dial/window settings.

ALE

Automatic Link Establishment (ALE), is really coming into its own as a serious radio mode, no more just a fun sub-hobby of collecting all those weird little callsigns ("addresses" in the jargon). The US Army is getting into ALE in a big way, with colorful calls like "Wagonmaster." The Air Force is adding heavily-encrypted computer networking capabilities to its already impressive array of bells and whistles which include autopatching and a seeming infinity of possible configurations.

Other militaries, foreign services, and even a few large companies are also going to ALE. Furthermore, there is more real traffic to be heard following the autolinking procedure.

All of this answers the commonly heard question of, "But is ALE really FOR anything?" Yes, it is, and it will continue to grow. Windows users will really want to try PC-ALE, the free program that started it all, but this is far from the only software out there.



The old Signal Corps flag logo

Quickest way to pick up ALE traffic is to scan 4721, 6721, 9025, 11226, and 131215 kHz USB, or just park on one of them, and wait for the US Air Force channel tests ("soundings") to ooze happily into your computer. With some luck, you'll also hear an auto-initiated phone patch or two. The Mexican military is also on 9025, with distinctive calls like TIBURON (Spanish for "Shark"), and repeated requests for Link Quality Assessment (LQA). LQA is best considered an automated radio check, asking another station for a signal report.

Weak Signals

Another common question is, of course, "How do I hear the Middle East in the US?" That's a tough one, as this is multi-hop, long-haul, high-latitude propagation. This means that it involves DXing (distant-transmitter reception) techniques. As a rough rule of thumb, the better the antenna the better the DX, though growing man-made noise threatens to complicate this situation.

As is true for a lot of easterly summer reception, propagation improves in late afternoon, peaking in the evening and dropping off through the night. Mornings are pretty dead.

Veteran DXers talk about the three layers of stations. The top and easiest layer is that of the big guns, with their high power and super antennas. These would include the major coastal and aeronautical stations, well documented in any utility frequency list, and capable of bending the signal meter on any radio made when the skip is even marginally in.

Next layer down is the in-and-out one that includes most of the interesting utilities. These are the aircraft, small vessels, ground-to-air radios, or other transmitters with 500-1000 watts into modest antennas. As any ham knows, this level of gear can also crank the meter when the band is really open.

Finally, there's the bottom layer. This contains all the unheard stations, way down in the noise. We know these exist, because big antennas like rhombics pull them right out. Back in the real world, it takes patience, propagation savvy, and plenty of luck to extract them. Suspected users include tactical networks, paramilitaries, and just ordinary people with mobile radios. Rarely will one be sure they are actually hearing "the war," but anything is possible. Right now, people are reporting a big increase in USB Arabic of unknown origin.

Where is New York VOLMET?

Hopefully, by the time anyone sees this, the routine aviation weather broadcasts from New York Radio will be back on the air. This is the VOLMET, a kind of French-ish contraction of "flying weather." At press time, its frequencies of 3485, 6604, 10051, and 13270 kHz USB were dead, and had been for several weeks. Many listeners, and some pilots who were monitored on the oceanic air route control frequencies, were wondering what happened to the VOLMET.

Repeated e-mails and calls to the Federal Aviation Agency (FAA), a mammoth US government bureaucracy which operates these transmitters, were not informative. Most of the people seemed perplexed, never having heard of this broadcast. Some weren't aware that shortwave aero radio still existed. This maze of public information officers and air control supervisors dead-ended at a voice mail, apparently with stress on the word "dead."

Hope the spring/summer bands aren't dead, and see you next month.

Utility World

Utility Logs

Hugh Stegman
hughstegman@monitoringtimes.com
www.ominous-valve.com/uteworld.html

ABBREVIATIONS USED IN THIS COLUMN

AFB	Air Force Base
ARB	Air Force Reserve Base
ALE	Automatic Link Establishment
AM	Amplitude Modulation
ARINC	Aeronautical Radio, Inc.
ARQ	Automatic Repeat Request teleprinting system
ARQ-E3	French ARQ teleprinting system
AWACS	Airborne Warning And Control System
CAMSLANT	Communication Area Master Station, Atlantic
CW	Morse code telegraphy ("Continuous Wave")
DEA	Drug Enforcement Administration
DSC	Digital Selective Calling
E10	Israeli phonetic English female numbers
E10a	Israeli phonetic numbers, callup-only or abnormal
EAM	Emergency Action Message
FAX	Radiofacsimile
FEC	Forward Error Correction teleprinting system
HFDL	High-Frequency Data Link (air digital system)
HF-GCS	High-Frequency Global Communications System
JSTARS	Joint Surveillance Target Attack Radar System
LDOC	Long-Distance Operational Control
LSB	Lower Sideband
M8	Cuban CW, "cut numbers" ANDUWRIGMT
M8a	Three-message case of above
MARS	Military Affiliate Radio System
Meteo	Meteorological
MFA	Ministry of Foreign Affairs
PACTOR	Packet Teleprinting Over Radio
PR	Puerto Rico
RCC	Rescue Coordination Center
RSA	Republic of South Africa
RTTY	Radio Teletype
SESEF	Ship Electronic Systems Evaluation Facility
SITOR-A	Simplex Teleprinting Over Radio, ARQ mode
SITOR-B	Simplex Teleprinting Over Radio, FEC mode
UK	United Kingdom
Unid	Unidentified
US	United States
USS	United States Ship
V2	Cuban Spanish female, "Atencion!" callup
V2a	Three-equal-message case of above
VFT	Voice Frequency Telegraphy

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time). "Numbers" stations (encrypted, usually unidentified, broadcasts thought to be intelligence-related) are identified in () with their ENIGMA station designators, as issued by the European Numbers Intelligence Gathering and Monitoring Association.

2461.5	27-Irish Navy vessel, with offline encrypted SITOR-A messages for JZL, at 2021. (Day Watson-UK)
2461.7	86-Irish Navy vessel, with brief SITOR-A chatter at 2030. (Watson-UK)
2670.0	New Orleans-US Coast Guard, with bulletins for PR, West Indies, and Caribbean, at 0339. (Ron Perron-MD)
3137.0	ICZ-US Air Force, Sigonella, Italy, sounding in ALE at 2002. (Watson-UK)
4462.0	Unid-probably Israeli intelligence (E10), with AM numbers at 0338. (Barry Williams-AL)
4472.0	Salmon-Mexican military, working Tiburon (Spanish for "Shark"), in ALE at 0414. (Jack Metcalfe-KY)
4479.0	Cuban "Atencion" numbers (V2a), in AM at 0304. (Camillo Castillo-Panama)
4557.0	Reach 0534-US Air Force transport, patch to Charleston via MARS AFA1EN, at 0057. OPEC 78-US Air Force Reserve tanker, with MARS patch at 0158. (Mark Cleary-SC)
4601.5	27-Irish Navy vessel, with offline encrypted SITOR-A traffic at 1703. (Watson-UK)
4721.0	Reach 907-US Air Force transport, with ALE-initiated patch to Hilda for weather, at 0342. (Cleary-SC)
4724.0	Reach 596Y-US Air Force transport, patch via Andrews HF-GCS to Casino Ops, Westover ARB, at 0439. (Cleary-SC)
4961.5	Operations-Illinois National Guard, working aircraft "456," at 0147. (Rick Baker-OH)
5010.0	FDG-French Air Force, Bordeaux, with a CW marker at 2044. (Watson-UK)
5019.0	HFB-UK military/diplomatic ALE net, Hereford, sounding at 2032. (Watson-UK)
5406.0	CLC51-Venezuelan military, working SCLC511, in ALE at 0346. (Metcalfe-KY)
5425.0	Echo Foxtrot-US Navy net, working November at 0137. (Baker-OH)
5598.0	Santa Maria-Atlantic air traffic control, working El Al 0001 at 0636, and Reach 1604 at 0643. (Brent Davenport-CO)
5616.0	Giant 8036-Aircraft working Shanwick, Ireland, at 2058. (Patrice Privat-France)
5696.0	CAMSLANT-US Coast Guard, VA, working "R-7-Y" in a go-fast search at 0218. (Cleary-SC)
5708.0	Armor-French Navy, Brest, working "Station 18," then weather in French, at 0104. (Perron-MD)
5732.0	Panther-US DEA, Bahamas, working 38C, at 2351. (Cleary-SC)
6449.7	PWZ33-Brazilian Navy, Rio de Janeiro, RTTY navigation warnings at 2151. (Bob Hall-RSA)
6458.5	Unid-Continuous Iraq war news from Associated Press, at 0942. (Davenport-CO) *[US Navy American Forces Network rebroadcast. -Hugh]*
6568.0	Unid-Extremely overmodulated music, not a pirate or entertainment broadcast, cut abruptly at 0623 (Williams-AL)
6697.0	Bad Alibi-US military, with EAM at 0408. (Jeff Haverlah-TX)
6712.0	Canforce 1654-Canadian Forces aircraft, working Croughton at 0242. (Baker-OH)
6721.0	Shuck 93-US Air Force E-3, in ALE-initiated patch to Raymond 24 (Tinker AFB, OK), returning to base with a mechanical problem, at 0237. (Cleary-SC)
6779.0	DRAQ-German warship *Bremen*, working DHJ59 at 0007. DRAN, warship *Augsburg*, working DHJ59 at 0222. (Baker-OH)
6854.0	Cuban "Atencion" numbers (V2a), in AM at 0301. (Castillo-Panama)
6912.0	CIO2-Israeli intelligence (E10a), AM callup only at 0245 (Williams-AL)
6933.0	Cuban CW "Cut Number" station (M8a), twice at 1202. (Castillo-Panama)
7535.0	"McFaul"-US Navy USS *McFaul* (DDG-74), testing with Norfolk SESEF at 1302. (Baker-OH)
7880.0	DDK3-Hamburg Meteo, Germany, with FAX weather charts at 2037. (Watson-UK)
7889.0	Cuban CW "Cut Number" station (M8a), 6 times at 1302. (Castillo-Panama)
7961.2	Snowball-Unknown military, calling Foxcreek in ALE, at 0102. Foxcreek, calling Majorleague11 in ALE, at 2317. (Watson-UK)
8285.0	Station 59-Possible Venezuelan military, working Musico Tango in Spanish and LSB, at 0225. (Perron-MD)
8834.0	SA0337-South African Airways, working station 8, Johannesburg, in HFDL at 1304. (Hall-RSA)
8906.0	Air Force One-US Air Force Presidential aircraft, working New York Radio enroute to the Azores Iraq war summit with Britain and Spain, at 1328. Went to 17946 at 1355. Air Force One, working Santa Maria on the return trip, at 2109. (Brent Taylor-New Brunswick)
8933.0	US Air 94, air traffic control with New York at 0050. (Baker-OH)
8971.0	Burrow 03-US Navy, working Blue Star, PR, in go-fast search at 0207. (Cleary-SC)
8980.0	CAMSLANT-US Coast Guard, VA, working "D-6-G" at 2342. (Baker-OH)
8983.0	Coast Guard 1790-US Coast Guard, sent to 5696 by CAMSLANT to join a missing aircraft search, at 1457. (Allan Stern-FL) CAMSLANT-US Coast Guard, working Coast Guard 2102 on go-fast search at 0106. CAMSLANT, search with Coast Guard 1708 at 2226. (Cleary-SC)
8992.0	Herky 75-US Air Force C-130, patch via Puerto Rico HF-GCS to Sigonella, Italy, reporting alpha-2 for pressurization, at 0223. (Cleary-SC) Herky 775, patch via Sigonella for Ramstein weather, at 1620. (Privat-France) Reach 383Y-US Air Force

Utility Logs

Continued

	transport, patch via Keflavik for Rota weather, at 2005. Reach 186Y, working Sigonella, at 2149. (Ary Boender-Netherlands)
9007.0	Shuck 93-US Air Force E-3, patch via Trenton Military, Canada, to Bangor, at 0219. (Cleary-SC)
9016.0	Winthrop-US military, with 28-character EAM simulcast on 8992 and 11244, at 1733. (Haverlah-TX)
9025.0	Reach 134Y-US Air Force transport, ALE initiated patch to Hilda Dispatch enroute from UK to Germany, at 0122. (Cleary-SC) 221100-US Air Force aircraft, ALE sounding at 2058. MPA-US Air Force, Falkland Islands, ALE sound at 2124. (Watson-UK)
9031.0	Haven Flight Watch-UK Royal Air Force, Ascension Island, working Air Transport 300, probably a US contract transport, at 0250. 273 Rear-Probable US Army, passing traffic to 273 Forward, at 1801. (Perron-MD)
9041.0	5YE-Nairobi Meteo, with RTTY weather observations at 1854. (Watson-UK)
10100.8	DDK9- Hamburg Meteo, Germany, with RTTY weather, then markers, at 0946. (Watson-UK)
10576.5	GYA-UK Royal Navy, Northwood, with Middle East weather charts in FAX, at 1900. (Watson-UK)
11175.0	Herc 08-US Coast Guard C-130, patch via Diego Garcia HF-GCS to joint task force, Key West, at 0139. Reach 333Y-US Air Force transport, patch via PR HF-GCS to Hilda for Kuwait arrival info, at 2242. (Cleary-SC) Seatrain-US military, patch to Abundant orderwire via McClellan, at 0202. Cobra 49-US Air Force, patch via Andrews to Davis-Monthan Operations, at 2013. (Haverlah-TX) Offutt AFB, NE, with 28-character EAM at 2323. (Davenport-CO) Skate Key-US military, possible Nightwatch net, attempting radio checks at 2330. (Mark Morgan-OH)
11217.0	GAF 491-German Air Force, calling DHM 91 (transport headquarters, Muenster), at 1403. (Perron-MD)
11232.0	Darkstar Yankee-US military, patch via Trenton to Tinker AFB, at 0103. Sentry 31-Probable E-3 front-end, patch via Trenton to Raymond 24, at 2154. Rescue 307-Aircraft on a search in Canada, patch to RCC via Trenton at 2155. (Cleary-SC)
11300.0	Addis Ababa-Air route control, Ethiopia, working Cairo at 0333. (Perron-MD)
11345.0	Atlas Jet 208-Atlas International Airlines, phone patch in Turkish at 1450. (Privat-France)
11407.0	AFA1MH-US Air Force MARS, working Reach 9189 at 2238. (Cleary-SC)
12070.0	Dewberry-US military, with 28-character EAM simulcast on 8992 and 11244, at 2012. (Haverlah-TX)
12161.5	Sibi Bel Abbes-Algerian prefecture, bulletins in PACTOR-I at 0730. (Privat-France)
13155.0	Unknown-Probable US military, with EAM at 2137. (Haverlah-TX)
13200.0	Reach 7438-US Air Force tanker, patch via Puerto Rico to Charleston at 2130. (Cleary-SC)
13215.0	Reach 9168-US Air Force, ALE initiated patch to Charleston at 2235. (Cleary-SC)
13257.0	Razor 61-US Air Force E-8 JSTARS, patch via Trenton to Peachtree at 0210. (Cleary-SC)
13927.0	Reach 860Y-US Air Force transport, MARS patch to Pope AFB to report diverting for engine problem, at 2137. Wolf 01-US Southern Air Force, reporting El Salvador arrival time at 2153. (Cleary-SC)
13973.0	MB1TBI-International Committee of the Red Cross, Tbilisi, Asian Georgia, relaying PACTOR mailbox traffic from RC2KAB (Kabul, Afghanistan) to RC2JAL, (Jalalabad, Afghanistan), at 0844. (Watson-UK)
13998.0	KZN508-Sailmail, Rockhill, SC, calling vessel WCV4543 in PACTOR at 1113, and vessel WBB5672 at 1120. (Watson-UK)
14408.0	Teal 17-US Air Force Reserve "Hurricane Hunter," describing winter storm flight to MARS AFA1LJ, at 2121. (Cleary-SC) *[Yes, the weather recon works large winter storms too. -Hugh]* Shark 21-US military, MARS patch to base in PR, came from 13927, at 2145. (Morgan-OH)
14606.0	Reach 7015-US Air Force, MARS patch to Wright-Patterson AFB, at 2136. (Cleary-SC)
15016.0	Offutt-US Air Force, 28-character EAM simulcast on 6739, 8992, 11175, and 11244, at 2328. Lajes-US Air Force, Azores, same EAM at 2351. (Davenport-CO)
15025.0	Wolf 01-US Air Force, working Smasher, also on 11205, at 2202. (Cleary-SC)
15043.0	IKF-US Air Force, Keflavik, Iceland, working ADW, Andrews AFB, MD, in ALE at 1956. 170028, aircraft, calling CEF, Westover ARB, MA, at 1939. 150001, aircraft, calling CEFNPR, Westover, at 2008. (Watson-UK) *[These Air Force ALE suffixes pertain to military computer network gateways at ground stations. NPR is Non-secure Internet Protocol Router (Niprnet), and SPR is Secret IP Router (Siprnet). SIL and DAT are also seen. -Hugh]*
16787.0	Unid-Unknown vessel with SITOR-A Philippines News Agency relay in English, at 1230. (Hall-RSA)
16800.0	LYEP-Lithuanian registry vessel *Koralas*, passing RTTY traffic at 0730. (Privat-France)
16804.5	636006301-Liberian registry vessel *Atlantic Pride*, DSC position at 0100. (Privat-France)
16806.5	Unid-Probably US Coast Guard, Boston, with SITOR-B navigation warning for combat training off the US, just before the Iraq war, at 1700. (Privat-France)
16976.0	PWZ33-Brazilian Navy, with RTTY advisory bulletins at 1915. (Hall-RSA)
17053.3	MGJ-UK Royal Navy, Faslane, with VFT fleet broadcasts on channels 2, 3, and 4, at 1140. (Watson-UK)
17147.0	CBV-Valparaiso Radio, Chile, FAX weather charts at 1130. (Hall-RSA)
17441.6	5YE-Nairobi Meteo, RTTY weather observations at 1850. (Watson-UK)
17940.0	Houston Radio-LDOC, working US Coast Guard 1716, went to 21964, at 2058. (Perron-MD)
17946.0	Air Force One-US Air Force Presidential aircraft, position for New York, then back to 8906 for Santa Maria, at 1528. (Taylor-NB)
17967.0	ZS-SNB-South African Airways flight 287, working Bahrain in HFDL, at 1610. (Privat-France)
18009.0	NATO 11-AWACS aircraft, patching command post via DHN 66 (German Air Force, Geilenkirchen), at 1635. (Perron-MD)
18012.0	Circus Vert-French Air Force, Villacoublay, working aircraft Cotam 1147, in French at 1730. (Perron-MD)
18018.0	Aircraft 203-Unknown flight asking an unheard LDOC for Miami Operations frequency, in Spanish at 2128. (Perron-MD)
18261.0	GYA-UK Royal Navy, Northwood, Middle East weather charts in FAX, at 1408. (Watson-UK)
18571.5	Unid-Tunisian diplomatic, Tunis, rogering a FEC message in French, at 1630. (Hall-RSA)
19031.7	Unid-MFA, Islamabad, Pakistan, with French language military SITOR-A traffic, at 1245. (Watson-UK)
19046.7	Unid-Egyptian embassy, Washington, DC, US newspaper extracts in Arabic, in SITOR-A, at 1706. (Watson-UK)
19131.0	Atlas-US DEA, working aircraft Flint 459 at 2123. (Perron-MD)
19313.1	Unknown-Possible United Nations High Commission for Refugees, with the same message broadcast on 19031.7 but in PACTOR-I, at 1355. (Watson-UK)
19691.0	FUF-French Navy, Fort De France, Martinique, with RTTY test loops at 1700. (Hall-RSA)
20754.4	Unknown-Possible International Red Cross, in PACTOR at 1526. (Watson-UK)
20801.4	Unknown- Possible International Red Cross PACTOR mailbox, listing computer files at 0821. (Watson-UK)
21949.0	008-ARINC, Johannesburg, RSA, with HFDL data at 1458. (Watson-UK)
21964.0	New York-ARINC, in air traffic control with Air France3520 at 1932. Miami Radio-LDOC, patching CWC 620 (Challenge Air Cargo) to company dispatch at 1954. (Perron-MD)
21982.0	QR0015-Unknown flight, passing position in HFDL, at 1512. (Watson-UK)
23214.0	PR1, US Customs, Puerto Rico, ALE sounding at 1456. UCG, US Customs, Chesapeake, VA, sounding at 1553. (Watson-UK)
25155.0	055-Unknown East Asian net, sounding in ALE at 1020. (Watson-UK)
25186.0	CYP-UK military/diplomatic net, Cyprus, sounding in ALE at 1441. (Watson-UK)
28271.4	"N"-Unknown single-letter beacon, not amateur or Russian, probably not a fish net either, at 1800. (Ken Brown-AL)

Digital Digest

Mike Chace
mikechace@monitoringtimes.com

Japanese Diplomatic Service Activity

This month we look at MFA Tokyo, which appears to have dusted off its transmitters after a long absence on HF. We also profile the equipment from Israel's Tadiran, now frequently heard on the HF bands, and do some investigations on the Brazilian Air Force.

Like many of the diplomatic operations we've covered in this column, we were about to assume that MFA Tokyo had gone into the history books of HF communications. However, alerted by a few recent messages in the WUN community (See Resources), it appears as though a few embassies are still active on HF.

Like many old HF diplomatic operations, the Japanese use standard SITOR-A equipment. Most of the traffic these days consists of short operator chatter in Anglicized Japanese but five-letter-group style off-line encryption has been seen, too. Much of the operator chatter appears to be test messages or confirmation of communications via some other means, perhaps satellite.

The recent activity from the embassies in Rabat, Tripoli, and others was heard on 14864.7 and 14508.7 kHz, but here's the complete list of other frequencies to watch:

7337.7 9280.7 10738.2 10898.0
13368.2 13379.7 14513.7 14675.7
15717.0 15717.7 18037.0 18265.7

Apart from the Anglicized Japanese, probably the most tell-tale signs of this operation is the keyword "Taishi" followed by the place name of the embassy. Here are some selected embassies, together with the callsigns and SITOR-A selective calls.

Call	Selcal	Location
ABGM		Abidjan, Ivory Coast
ADGM	BYPQ	Addis Ababa, Ethiopia
AMGM	BYVY	Amman, Jordan
BDGM		Baghdad, Iraq
PKGM		Beijing, China?
BRGM		Berne, Switzerland
EPVP		Bucharest, Romania
CAGM	UQVP	Cairo, Egypt
CRGM		Caracas, Venezuela
GMCK	BCVC	Conakry, Guinea
DMGM		Damascus, Syria
GMKT	UQVM	Khartoum, Sudan
GMKI	BQKK	Kinshasa, Dem Rep Congo
NAGM	BYPX	Nairobi, Kenya
QIGM		Quito, Ecuador
RDGM		Riyadh, Saudi Arabia
GMTH	UQVQ	Teheran, Iran
HGGM		The Hague, Netherlands
TRGM		Tripoli, Libya
WIGM		Vienna, Austria
WSGM		Washington, USA?

Note that the callsigns are made up of "GM" (short for *gaimen*) as either prefix or suffix to a couple of letters as mnemonic for the place name.

Here's an example of embassy chatter between Ghana and Gabon, starting with the initial selcal sequence.

```
bqqq bqqq bqqq bqqq bqqq bqqq bqqq bqqq bqqq
taishi ghana
de ghana
daima kiki sbuuri kanrybu ni tuki
test cyuu desu
donataka orare masuka )kotiraha gabon
taisikandesu
seijouni jusin siteorimasu +?
gozaimasu surukamo shirenai node
masu+?
ita +?
tks bibi
```

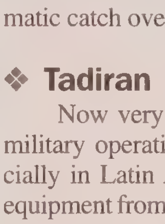
Look out for this interesting and rare diplomatic catch over the summer.

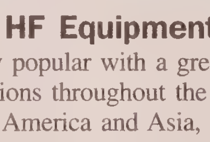
❖ Tadiran HF Equipment

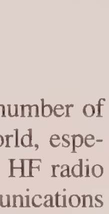
Now very popular with a great number of military operations throughout the world, especially in Latin America and Asia, the HF radio equipment from Israel's Tadiran Communications can be heard most anywhere.

With its roots as the sole supplier to the Israeli Defense Force (IDF), Tadiran started as a licensed manufacturer of NATO standard radios in the mid 1960s. By the 1970s and 80s the company had started developing and selling its own systems. It has pioneered a number of proprietary ALE (automatic link establishment), frequency hopping and voice encryption systems since those early beginnings which has driven an increasing reputation among army circles.

The company is now selling its fourth generation line of equipment, the HF-6000 series, which continues the trend of advanced HF radio equipment. The pictures show the flexibility of the 6000 series in both manpack, vehicle, and high power fixed configurations.







Here in the US, it is now hard to go a day without hearing the 125bd 4FSK signal that is characteristic of a number of different modes of the Tadiran radios. The first is their proprietary voice encryption scheme which is most easily recognized by the 125bd 4-tone FSK signal that accompanies the encrypted speech. The signal starts with a brief burst of 1000 Hz tone, followed by 125bd data, presumably to exchange encryption keys, with the 125bd data continuing to accompany the voice transmission throughout.

One can only describe the encrypted voice as high speed monkey chatter!

The four tones of the 125bd data are centered at +2850Hz above the USB point and each separated by 300 Hz. The same 125bd 4FSK signal is also used to send low-speed data between stations and the proprietary ALE signal, called AUTOCALL.

See the Resources section for details of audio clips from the Tadiran systems.

❖ Brazilian Forces Net

Some more WUN posts provided an excellent day's investigating here at DD Towers recently. This exercise again shows how much information can be gleaned from trying ALE identifiers as the search terms in a simple web search.

Tony Paredes in Buenos Aires noted Portuguese voice on 17982 along with some ALE, too, and speculated that they were Brazilian Air Force. Over a few nights of monitoring the frequency, we noted the following ALE IDs:

ANTARES, HERMES, OM1EG, ORUNGAN, SATURNO, TAMOIO, TAURUS, TRITAO, and TRIBO

Of these IDs, ORUNGAN provided the most promising lead to confirming Tony's idea. ORUNGAN is the name of the mythical beast adorning the insignia of the Brazilian Air Force's 1st Squadron, 7th Group, flying from the base at Salvador (See Resources). Noting this is a coastal patrol squadron, checking Brazilian Navy sites soon showed most of the other IDs as belonging to Navy ships. Here's the complete list:

Antares is a BN survey ship
Hermes possibly Air Force HQ
Om1eg unidentified
Saturno unidentified
Tamoio is a submarine
Taurus is a coastal survey ship
Tritao is a patrol tug
Tribo unidentified

Until next time, happy hunting.

Resources

Tadiran - **http://rover.vistecprivat.de/~signals**
AUTOCALL - **.../WAV/TADIRAN-AUTOCALL.WAV**
Data - **.../WAV/TADIRAN-DATA.WAV**
Voice Encryption - **.../WAV/TADIRAN_VX-cry.WAV**
Brazilian Air Force, Salvador - **http://www.basv.aer.mil.br/**
World Utility News - **http://www.wunclub.com**

Shortwave Broadcasting

Glenn Hauser
P.O. Box 1684-MT, Enid, OK 73702
glennhauser@monitoringtimes.com
www.worldofradio.com

ALBANIA R. Tirana A-03 English: England 1845-1900 9520 7210, 2130-2200 7130 9540; NAm 0145-0200 and 0230-0300 6155 7160; daily except Sun/UT Mon (Drita Cico, ALR, via Alokesh Gupta)

ANGOLA R. Nacional de Angola, Luanda, 7217.3, 2100 ID in English "This is Luanda, International Service of Angolan National Radio." News and economics, fair (Leigh Morris, Coorong SA DXpedition, *Australian DX News*)

AUSTRIA ROI's only remaining English to NAm is 0130 on 9870 (Bob Thomas, CT) Radio Austria International will cease operations on 30 June, 2003. ORF says the company is no longer in a position to operate an international service for solely financial reasons. There will, in future, be a radio program on ROI's present frequencies. The ORF will broadcast Österreich 1 (Ö1), its cultural radio station. That, at any rate, is the proposal made by ORF management to the board of trustees (via Michael Weigand, *DXLD*)

Only small parts of Radio Austria International (Logo, station's tune, a daily 15-Minute-English-Journal...) will survive; the program will consist then mainly of relays of the domestic program "Ö1", including English and French news "shortly after 0800" [presumably 0600 UT now]. From July the name will be "Radio Österreich 1 International." (Willi Passmann, DJ6JZ, *hard-core-dx*)

BAHRAIN Radio Bahrain is back on shortwave; perhaps they got their old transmitter out of mothballs for the Iraq war. Since early April I've been hearing their General [Arabic] Program on 9745, apparently round the clock; transmission mode is AM with suppressed lower sideband. No sign of their English service on 6010, though! (Dave Kernick, England, *World of Radio*) on 9745 at 1605 *"Idha'tul Bahrain"*, Arabic music. Mode is AM with suppressed LSB, as Dave said. Decent signal here (Jari Savolainen, Kuusankoski, Finland, *DX Listening Digest*) 9745 in Arabic at 2210-2305, science and stock reports, Arab music, 2300 timesignal and news headlines, 2303 clear ID; QRM from HCJB (Guenter Lorenz, Italy, *A-DX* via *BC-DX*) Blocked here by HCJB in Quichua 2130, English 0000- (Wolfgang Bueschel, Germany, *DX Listening Digest*) R. Bahrain seems to be active both on 6010 and 9745 with Arabic programming. (Mauno Ritola, Finland, *SWBC*)

BOLIVIA R. San Gabriel, La Paz, at 0910-0935, on new 6080 ex-6085v, in Aymara and Spanish, very nice Andean music (Arnaldo Slaen, Argentina, *Conexión Digital*)

BRAZIL 4895, R Baré, Manaus, AM, 0845-0905, reactivated on the tropical bands after three years absence! (Samuel Cássio M., Brasil, DSWCI *DX Window*) Not that long. I heard it 12 Oct 02 and occasionally since (Pentti Lintujärvi, Helsinki, Finland, *DX Listening Digest*) ID is "Nova Rádio Baré"; in charge of programming is the Proclip ad agency, between 2000 and 1200 for the interior of the Amazon (Paulo Roberto e Souza via Célio Romais, Panorama, *@tividade DX*)

BULGARIA R. Bulgaria DX program: Fri 2138 5800 7500, 2338 and Sat 0238 9400 11900, Sun 0638 11600 13600, 1138 11700 15700 (Rumen Pankov, Bulgaria, *BC-DX*)

CANADA CBC Radio 1 started in April a new satirical review, *What A Week*, Sat 11 am local (gh) 1505 UT on CBC Northern 9625. A revival of CBC's long-lost tradition of satirical comedy. I have missed the CBC's ability to look at a very serious world and reduce it to a satirical rubble heap while exposing the world's essentially asinine substructure (Joe Buch, DE, *swprograms*)

COLOMBIA LV del Guaviare, 6035, often heard with national anthem at the odd time of 2258; also heard the Ecuadorian anthem; why? (Tore B. Vik, Norway, *SW Bulletin*) Football reports, some from abroad; football and national anthems stick together (Björn Malm, Quito, Ecuador, *ibid.*)

CONGO R. Congo, Brazzaville, 4765, at 2217-2324, French ID, test program playing Chinese opera! (Maybe to support the repair sponsor?) Test programs were mentioned about every 15 minutes: 0900-0300 4765 and 0300-0900 9610: and 0900-1500 7115, 1500-2100 9610, 2100-0300 4765 and 0300-0900 9610. Reception reports were requested to Direction Générale de Radio TV du Congo, B. P. 2912, Brazzaville (New address!) Had been off 4765 since August 2001 except for a few days in February 2002 (Anker Petersen, São Tomé e Príncipe, DSWCI *DX Window*)

CUBA RHC has a new frequency, 9820 for 1100-1400 *Despertar con Cuba*, a magazine at a moderate pace with easy to understand Spanish. Also resumed afternoon service in English and French on 11760 (Arnie Coro, ODXA) Presumably English at 2030-2130, ex-11670, ex-13 MHz (gh)

[non] Salvador Lew, tapped by President Bush to head both Radio and TV Martí, has resigned for health reasons, the *Miami Herald* reports. However, Lew's resignation as Director of the Office of Cuba Broadcasting comes amid allegations of sexual harassment and favoritism since taking the post in 2001 (*Radio & Records* via Brock Whaley) Bush nominated Miami attorney/lobbyist Pedro Roig to take over as Director of R/TV Martí (*AllAcces.com* via Whaley) Both he and the late Cuban American National Foundation Chairman Jorge Mas Canosa went to training camp together and were very close, Roig said (*Miami Herald* via Mike Terry) It's Pedro Roiga (VOA News via Jilly Dybka)

CYPRUS CyBC A-03: Fri/Sat/Sun 2215-2245 on 6180, 7205, 9760, 250 kW, 314 degrees (in Greek to UK) (Merlin via (via Alokesh Gupta, DXLD)

*All times UTC: All frequencies kHz; * before hr = sign on. * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; A-03=summer season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated*

CZECH REPUBLIC R. Prague heard on another unexplained frequency, 6961 best in USB, at 0130 in Spanish, supposed to be on 7345 and 6200. 7345 was excellent, but didn't hear 6200. 6961 was fairly strong, about S3 (Bill Wilkins, Springfield, MO, *DX Listening Digest*) Similar unexplained appearances were on the 5 and 8 MHz maritime bands. Suspect someone is messing around with relaying them without authorization (gh)

DENMARK HFCC has registrations for World Music Radio, Denmark, 10 kW: 5790 1400-2300 daily and 0700-1400 Sat/Sun; 6290 and 15810 24 hours; and on 7700 DRM 24 hours (Michiel Schaay, Cumbre DX) WMR is indeed planning to return to the air from transmitters in Denmark. I don't think we will be using 5790 after all - because it suffers from severe splatter from powerful Radio Bulgaria on 5800. Tests on AM only hopefully are due within a few weeks of April 5 (Stig Hartvig Nielsen, Denmark, *DX Listening Digest*)

[non] The possible closure of Radio Denmark by the end of this year will be decided finally around May 1 (Erik Køie, DR Radio, *DX Listening Digest*)

ECUADOR HCJB Abandons North America and Europe (See CLOSING COMMENTS, p.92)

On 5966.59, Radio María, unknown location at 0235. Was heard only one evening and the morning after with strong signal. Some years ago La Voz del Upano on 5965.00 was heard for a short period where they emphasized that it was only local broadcasts from Tena. Radio María said they had started broadcasting from Galápagos but gave only an FM-frequency. Possibly this is from there too (Björn Malm, Quito, Ecuador, *SW Bulletin*)

EGYPT R. Cairo's new frequencies in English to NAm are both busts: At 2300-2430, 11725 badly squeezed by much stronger adjacents; at 0200-0330, 11780 clashing directly with usually stronger Brazil (gh, OK; Bob Thomas, CT)

EQUATORIAL GUINEA Radio Nacional, Radio Bata, back with great modulation and signal here, 5005 at 2025, African music (Jari Savolainen, Kuusankoski, Finland, *DX Listening Digest*) R. Nacional, Bata, heard with strong signal and excellent modulation on 5003.2, 2039-2110 (Kyriakos Dritsas, Thessaloniki, Greece, DSWCI *DX Window*)

FALKLAND ISLANDS [non] BBC service moves inband for A-03: 11720 Tue & Fri 2130-2145 via Rampisham, 500 kW, 209 degrees (Merlin via Alokesh Gupta)

FRANCE [non] For the A03 season, RFI has several new relay sites abroad (direct from France, u.o.s.):

Ascension	0400-0500	7150
	0600-0700	11665
	1200-1230	17815
Rwanda	0600-0700	17770
UAE	0400-0500	13780
	0500-0600	13640
	1700-1800	6010
Tajikistan	1600-1630	6020
Singapore	1600-1630	6035
Uzbekistan	1700-1800	9530 (Jean-Michel Aubier)

RFI A-03 English:

0400-0430	9550-G, 11700, 13610 (replaced by 11910-G from Sept 7)
0500-0530	11685-G (replaced by 15155 from Sept 7), 17800
0600-0630	11665-A, 17800, 21620
0700-0800	15605-G
1200-1230	17815A. 25820
1400-1500	11610-X. 17515
1600-1700	9730-S, 11615, 15255-S, 15605, 17850
1700-1730	15605

G=Gabon, A=Ascension, X=Xi'an, S=South Africa (Website via Mike Barraclough, Letchworth, UK, *DX Listening Digest*)

GABON Radio Gabon reactivated on 4777 at 1735-1800, official messages in mostly French (Christer Brunström, Sweden; Jari Savolainen, Finland, *DX Listening Digest*) Another day, 1836-1901 (when they abruptly shut the transmitter off), news in French, 1850 African songs, vernacular. Very strong. I fear it's erratic use of this old outlet (Carlos Gonçalves, Portugal, *BC-DX*) Had not been reported on 4777 since July 2000 when it was replaced by 7270 that continued until May 2001 (Anker Petersen, DSWCI *DX Window*)

GHANA GBC Radio 1 is back on 4915 after two months off due to transmitter breakdown, apparently fixed with valves from Radio 2, which disappeared the same day from 3366, 6130 (Charles Wompiah, Obuasi, Ashanti Region, Ghana, Cumbre DX) 4915 at 2138 classical music program in English, 2200 Drums and pips "It's 10 o'clock, this is Radio Ghana," news. Nothing heard on 3366 (Scott R Barbour Jr, NH, *DX Listening Digest*)

HUNGARY A-03 28-minute English from Radio Budapest: Eu 1500 Sun 6025, 9715; rest daily: 1900 3975, 6025, 11720; 2100 6025; SAf 2100-2128 11890; NAm 0100 9590, 0230-0258 9570 (Ivo and Angel! Observer) 9590 collides with Iran, also in English to NAm then (Bob Thomas, CT)

ICELAND A03 RUV news relays in Icelandic: Eu 1215-1300 15775, 1755-1825 13865; NAm 1410-

1440 & 1835-1905 15775, 2300-2335 13865. Provided by Iceland Telecom in AM-compatible A3A mode (USB-6dB). (RUV via Bernd Trutenau, Lithuania, *DX Listening Digest*)

INDIA AIR A-03 English, none intended for NAm:

1000-1100	13695 15020 15260 15410 17510 17800 17895
1330-1500	9690 13710
1745-1945	7410 9445 9950 11620 11935 13605 15075 15155 17670
2045-2230	7410 9445 9575 9910 9950 11620 11715
2245-0045	9705 9950 11620 13605

(via Jose Jacob, *dx-india*)

AIR Vividh Bharathi on 10330 is now transmitted only via Bangalore 500 kW: 0025-0435, 0900-1200, 1245-1740. Till 18th March 2003, 4 different transmitters at Chennai, Delhi, Mumbai and Guwhati running in parallel, were in use. These are now heard with tests on 7270, 7170, 7220 and 7190 respectively. It will be interesting to note how reception is now on 10330 compared to earlier days (Jose Jacob, *dx_india*)

IRAN VIRI A-03 English; () frequencies are presumably alternates as parameters match those on the other channels, starting with NAm: 0030-0230 9590 11920 (6135 9835); 1030-1130 15450 15550 15600 21470 21730; 1530-1630 7245 9635 11775 (9720); 1930-2030 9800 11670 11750 11860 (13730); 2130-2230 9870 13665. see HUNGARY

Ebri is that service in Hebrew, called "Voice of Davud"; only some frequencies in the 1900 are aimed toward Israel, the rest toward NAm: 0230-0300 9910 11925 (both until Aug 30 only) (6010 6135); 0700-0730 21560; 1900-1930 5970 7175 7315 (via Swopan Chakroborty, India, *DX Listening Digest*)

[non] New clandestine via Norway: Voice of Iran in Persian: 1800-2057 on 7525 (55555) via Kvitsøy 200 kW, 120 degrees to ME, not \\ on 11575 1630-1830 via Issoudun, France, 500 kW, 090 degrees (Ivo and Angel! *Observer*, Bulgaria) Station in Farsi 1830-2100 on 7525 is *not* Radio Seday-e Iran but Radio YARAN (*yaran* means friends). The station is on internet and satellite for quite a while; details at American Farsi Netlink, Simi Valley, CA, http://www.afnl.com (Wolfgang von Poellnitz, Poland, *hard-core-dx*) Same audio but with couple of seconds delay at http://www.bamey.com/voice1.html (Jari Savolainen, Finland, *DX Listening Digest*)

After UK troops took the R&TV building in Basra Mar 27, some of the clandestines stopped their broadcasts: Voices of Mojahed and Communist Party of Iran on 3880, 4380 (Rumen Pankov, Bulgaria, via Wolfgang Bueschel) As early as Mar 23, Voice of Mojahed, Eastern Iraq, usual broadcasts in Farsi and Iranian jamming were not heard at 0310-0320 or 1550-1600, on any of these frequencies! Maybe the station suffered battle damage or Saddam intended to use the transmitters for other purposes? 4650v 5350v, 5650v, 6450v, 6750v, 6950v, 7050v, 7070, 8250v, 8350v, 8600v, 8850v, 9350v, 10250v, 10450v and 13450v (Anker Petersen, Denmark, DSWCI *DX Window*)

IRAQ Most of the media action in the war did not concern shortwave. As soon as the US attack began, everyone tried to monitor Baghdad's only known SW broadcast frequency, 11787. Although other media were knocked off the air earlier and often, this frequency was heard intermittently, only in Arabic. Its frequent interruptions, which had been happening long before the war, caused repeated speculation that it had finally been hit. But press reports about Baghdad Radio being bombed no doubt referred to MW or FM. Then on Mar 22, Vlad Titarev in Ukraine discovered a new official outlet, 6175, at 0500-0800, and in the local evening, but that lasted only a few days.

European monitors were in a much more advantageous position; but a few North Americans managed to hear Baghdad. As late as April 2, John Santosuosso reported a brief English segment at 2235-2237 on 11787.

Information Radio, the US-sponsored outlet which had been on the air for some months, was another center of attention, on 9715 at greatly extended hours, but with new clashes as A-03 began, such as Tashkent; and from March 28 on new 4500, discovered by Tarek Zeidan in Egypt, with separate programming seemingly aimed at Kurdistan, which also see, where several clandestines have occupied the 4.0+ MHz frequency range for years. On assignment in Qatar, Mika Mäkeläinen, compiled this exhaustive report on Information Radio: http://www.dxing.info/profiles/clandestine_information_iraq.dx

Undelayed DX news sources such as DX Listening Digest, dxing.info, BBC Monitoring, hard-core-dx, cumbredx and Clandestine Radio Watch covered this in exhaustive detail, not only shortwave, archived at http://www.worldofradio.com/dxldmid.html

IRELAND [non] RTE A-03 via Merlin: 1000-1030 15280 Singapore to Au; 1800-1830 15585 Rampisham to ME; 1830-1900 13640 Sackvile to NAm and 21630 Ascension to Af; 0130-0200 6155 Rampisham to CAm (via Alokesh Gupta)

ITALY Rai International A-03 in English:
0435-0500 6110 7235 9875 Spain-North Africa partly in Italian
1935-1955 5970 9745 NEu
2205-2230 11895 As/Oc
0055-0115 9675 11800 NAm
(via Ramón Vázquez, Spain, *DXLD*)

KASHMIR [non] Radio Sadayee Kashmir, new afternoon broadcast on 9890 at 0730-0830; also use 6100 at 0230-0330 & 1430-1530 (Jose Jacob, India, *dx_india*) 6100 at 1515-1531 lots of talk about Pakistan (Björn Fransson, Sweden, *SW Bulletin*)

KURDISTAN On 4085 at 2027 March 26, heard a man calling the people of Iraq in English, saying Saddam's time is up and telling them to stay away from military targets, etc., 2031 Kurdish music and news, same English segment heard at 2125; 2130 Kurdish music and songs till 2200*. SINPO 44544, best on USB. Next day English at 1825, and 2025. Presumably Voice of Iraqi Kurdistan (Edwin Southwell, UK, World DX Club) An 8-minute audio clip of Voice of Iraqi Kurdistan addressing the Iraqi military and general population in English ("Soldiers of Iraq, among you are Sadaam's evil henchmen") can be heard on the Interval Signals Archive website at http://www.intervalsignals.net (follow the IRAQ link in the left-hand column), as recorded from 4085 kHz at 1540 31st March 2003 (Dave Kernick, UK, *DX Listening Digest*)

KUWAIT As soon as the war began, Radio Kuwait dropped Persian and English, the latter replaced by Arabic 1800-2100 on 11990 (Uwe Volk, *A-DX* via Wolfgang Bueschel; Mike Barraclough, UK)

LEBANON [non] V. of Liberty, 11520, 1608-1625, Arabic talk and music, IDs (Kouji Hashimoto, *Japan Premium*) Not to be confused with LIBERIA station of same name nearby on 11515, below

LIBERIA On March 28 we began testing our transmitter in Liberia on 11515. This transmitter is directed right to the HEART of the Islamic world, piercing through the Muslim veil in northern Africa and into the Middle East, centered on Israel. We finalized the agreement on the three 100 kWs in the Seychelles, and our engineer will be going there in April to begin the dismantling process. We are currently simulcasting our Voice of Liberty FM in Monrovia, Liberia on this new SW station. Hopefully by the middle of June, this will also be operating independently (Doc Burkhart, WJIE, *DX Listening Digest*) Heard at 1530 and got a quick reply from Doc Burkhart at WJIE wjiesw@hotmail.com (Jarmo Patala, Finland, *dxing.info*) This V. of Liberty not to be confused with the clandestine for Lebanon of almost the same name (in Arabic) which used to be on 11515, then 11520! (gh)

LIBYA [non] I've trawled the bands in daytime and not heard Libya anywhere – except via their Issoudun, France, relays. I think 15435 was the last direct frequency to go off air; 17750 preceded it. Most likely the transmitters just gave up! (Noel R. Green, UK, *BC-DX*)

MALAYSIA RTM, VOM and V. of Islam A-03

4845	24-hrs	RTM Kajang Tamil domestic
4895	2200-0100	RTM Kuching domestic
4895	0800-1500	RTM Kuching domestic
5030	2200-0000	RTM Kuching domestic
5030	1000-1500	RTM Kuching domestic
5965	24-hrs	RTM Kajang Malay domestic
5980	2200-1500	RTM Kotakinabalu domestic
6025	0200-1400	RTM Kajang domestic Malay and dialects domestic
6025	1400-1700	VOI Kajang Malay As
6050	2200-1500	RTM Sibu domestic
6060	0400-1500	RTM Miri domestic
6100	1300-1530	VOM Kajang Thai, Burmese As
6175	0300-0700	VOI Kajang English Indonesia
6175	0700-0830	VOM Kajang English Indonesia
6175	0900-1400	VOM Kajang Indonesian
6175	1700-1900	VOM Kajang Indonesian
7130	0400-0600	RTM Kuching domestic
7270	0800-1500	RTM Kuching domestic
7295	24-hrs	RTM Kajang English domestic
9750	0300-0700	VOI Kajang English As
9750	0700-0830	VOM Kajang English As
9750	0900-1400	VOM Kajang Indonesian
9750	1700-1900	VOM Kajang Malay
11885	1030-1230	VOM Kajang Mandarin
15295	0300-0700	VOI Kajang English Au NZ
15295	0700-0830	VOM Kajang English Au NZ
15295	1530-1900	VOM Kajang Arabic ME

Footnotes:

1. 9665 is registered with the ITU with 250 kW from Kajang 0300-1230 to Au and NZ, as an alternative frequency to 15295.
2. Operating times and days for domestic services from Kuching, Sibu and Miri are variable.
3. Voice of Islam English is listed 0300-0600 but may be extended to 0700 on some days.
4. Kuching 4895 and 5030 are subject to constant disruption due to technical problems and may be discontinued (EDXP *World Broadcast Magazine*, http://edxp.org used by permission)

MALTA [non] V. of the Mediterranean, English, Sunday only 0800-0900 on 9605 via Rome, same the 1730-1800 Mon-Sat. Also 1900-2000 exc Fri on 12060 via Russia (Mike Barraclough, UK, World DX Club *Contact;* Ramón Vázquez Dourado, España, *DXLD*) Shifted address to: Chircop Building, Floor 2, Valley Road, Birikirkara, BKR14, Malta (Swopan Chakroborty, Kolkata, India, *DXLD*)

MÉXICO Candela FM, 6105 at 0802 with ballads, *"Candela!"* quick canned IDs, listener's requests (Jilly Dybka, TN, *Cumbre DX*) That one had been inactive quite a while, from Mérida, Yucatán (gh) XEQM "Rasa Onda Corta," very clear with news until 1200, then intense QRM from Taiwan (Héctor García Bojorge, DF, *Conexión Digital*)

NETHERLANDS A revised reorganization plan for Radio Netherlands was presented to the staff on April 14, following three months of intensive discussion and consultation. The new plan adheres to the principles of the one rejected by staff in January, but the number of full-time job losses is reduced from 60 to 17. Despite a reduced budget, there will be new activities for RN, including an Arabic-language Web site. Daily output of programs in Dutch for Europe will be cut back. There will be a reduction in SW transmitter hours of services in other languages (© Radio Netherlands *Media Network*, also via Harry van Vugt, Harm Deenen)

NIGERIA [non] On March 27, Jakada Radio International resumed its broadcasts, M-F 1900-1930 on 15170 towards Nigeria (Ludo Maes, TDP Mailing List, Belgium) from where? (gh) South Africa, 250 kW, 335 degrees (Ivo and Angel! *Observer*, Bulgaria) No break in transmission after VOA via Morocco on 15170 until 1859 (Jerry Berg, MA, DSWCI *DX Window*)

PAKISTAN A-03 PBC: Assami [has been partly in English] 0045-0115 SAs 11650 15625; English 1600-1615 Af/ME 11570 15065 15725 17820; Urdu 0800-1104 Eu 17835 21465 – usually includes English approx. 1100-1104 [and 0800-0804?] (PBC via Wolfgang Bueschel via Alan Roe, *DXLD*) 0045 actually heard on 11640 (Jose Jacob, *dx_india*)

PAPUA NEW GUINEA A new operation in Port Moresby is coming, 24 hours on 7120 and 7180 (Johno Wright, Australia, ARDXC)

PERÚ Chris Gardner, KC4WHY, manager of R. Macedonia, in Arequipa, 4890, says they are using a 1 kW transmitter made by HCJB. Then off the air for a missing spare part. Antenna is in one the higher parts of the city of Arequipa, called Zamacola, at an altitude of 8,500 feet above sea level, a dipole 10 meters off the ground. In the next couple of months hoping to install a lazy H antenna. TV audio was temporary test (gardner@uttermost.net via Henrik Klemetz, Sweden, *DX Listening Digest*) 4890.08, R Macedonia, Arequipa, new station, according to http://www.uttermost.net and http://ibfe.org belongs to the "Macedonia World Baptist Missions Inc. and the Crown College of the Bible" in Powell, Tennessee! (Anker Petersen, Denmark, DSWCI *DX Window*)

In Oct 2002, the Finnish DXer Jari Lehtinen, heard an unID Spanish gospel transmission on on 4975, at approx. 0630. For various reasons, he did not believe this was the listed Radio Del Pacífico. He sent me an audio clip, and I found that this was an actual broadcast, with time pips, frequency info etc., from Vida FM, which is sort of a second local HCJB program aired locally in Quito. This leads me to think that this could have been a transmitter test arranged by HCJB engineers before shipping the transmitter to Arequipa. No response from Allen Graham about this (Henrik Klemetz, *dxing.info*)

At http://www.radiovozdesalvacion.100megas.com/index.html I read of a new 24h operation from Arequipa, on 6035, OAX6B. Address: Apartado Postal 105 Serpost, Cercado, Arequipa, Peru. Callsign OAX6B was assigned to Radio Landa, which used to be on 6035 decades ago. Radio Internacional, La Voz de la Salvación, is not yet on the air, says José Vera in an e-mail, but will be a full scale operation "such as that of HCJB." They are holding the Radio Landa license and SW transmitter. Power will be raised (Henrik Klemetz, Sweden, *DX Listening Digest*)

PHILIPPINES PBS audible on 9581.5, tune-in 0855, discussion program in Tagalog from 0900, smatterings of English. Re-check 0945 phone-in program, mentions of Manila. News 1000, seemed to go off shortly after 1010 (Craig Seager, Bathurst NSW, ARDXC)

PBS external transmissions via IBB Tinang, A-03 with azimuths: Filipino & English: 0200-0330 15270 283, 15120 315, 11885 283; English 1730-1930 17720, 15190, 11720, all 283 degrees (IBB A-03 via Wolfgang Bueschel)

POLAND R. Polonia A-03 English has been reduced on SW to: 1200-1259 11820 9525; 1700-1759 5995 7285. These and additional broadcasts are on satellite and/or WRN (via Alan Roe) They hoped 11820 would be received in NAm (Mike Barraclough, UK, *DX Listening Digest*)

SAIPAN The Marianas Public Lands Authority has recommended a 15-year lease extension for Far East Broadcasting Co. which currently occupies 5 hectares of public land in Marpi, according to acting MPLA Commissioner Frank Eliptico. Eliptico said the original 25-year term of the FEBC lease started on Feb. 4, 1981, and is set to expire on Feb. 3, 2006. He said the MPLA board voted unanimously to support the extension of FEBC's lease so that it could continue "broadcasting fundamental principles of human and religious rights to undeveloped and developing countries." Henry Hofschneider, MPLA commissioner, said the company has nine missionaries and four staffers working on its leased premises. FEBC pays MPLA $20,945.26 annually and this amount will increase by 15 percent every five years during the extension period, if approved by the Legislature (Gemma Q. Casas, *Marianas Variety* via E. Baxendale)

SAUDI ARABIA [non] Frequency change for Voice of Reform in Arabic via Kvitsøy, Norway, 200 kW, 120 degrees to ME, 1800-2000 on new 12025, excellent here, ex 1830-2128 on 7590 (Ivo and Angel! *Observer*, Bulgaria)

SERBIA & MONTENEGRO [non] R. Yugoslavia A-03 English half hours: 1830 and 2100 Eu 6100; 2200 exc Sat 7230 Au; 0000 exc Sun 9580 NAm; 0430 daily 9580 NAm (R. Yugoslavia website via Daniel Sampson, *Prime Time Shortwave*)

SEYCHELLES [non] Its original site dismantled, FEBA A-03 English now via sites elsewhere: SAs 1500-1600, first quarter slow, 7460 Irkutsk. SWAs 0030-0045 slow 9465 Moscow; ME 1245-1300 slow 15530 Armavir, all Russia (Schedule Engineer, FEBA Radio, UK via Alokesh Gupta)

SPAIN Radio Exterior de España, A-03 English until 25 Sept: 2000-2059 15290 M-F Eu, 2000-2059 9570 M-F Af, 2100-2159 9840 Sa-Su Eu; 2100-2159 9570 Sa-Su Af; 0000-0059 15385 America (REE website, via Daniel Sampson, Alokesh Gupta) One of our favorite programs on REE, mostly classical music, *Nuestro Sello*, now scheduled: M-F 1405-1500 on 15585 17595 21540 21570 21610; Tu-Sa 0105-0200 6055 9535 9620 11680 15160 (gh)

SRI LANKA Sri Lanka Broadcasting Corporation in English to SAs: 0030-0430 6005 11905 15745; 1230-1530 6005 11930 15745 (Jose Jacob, VU2JOS, AT0J, *dx_india*)

SWITZERLAND [and non] SRI's remaining English, A-03, azimuths:
0730 13650-G 200, 15445-G 160, 21750-S 165
0830 21770-S 165
1730 13750-G 115, 15515-G 115, 17870-S 140
1930 11815-G 160, 13645-G 200, 13795-S 140, 15220-F 115
2330 9885-S 230, 11905-F 175
G = Germany, S = Switzerland, F = French Guiana
(via Ramón Vázquez Dourado, Spain, *DXLD*)

TURKEY V. of Turkey A-03 English: 1230-1330 17830 Eu, 17595 Au; 1830-1930 9785 Eu; 2030-2130 9525 As/Au; 2200-2300 9830 11960 Eu/NAm, 0300-0400 11655 Eu/NAm, 7270 As/Af. 11655 changes to 9650 on 31 Aug (via Alokesh Gupta, New Delhi, India, *DXLD*) 12000 replaces 11960 at 2200 (*Observer*, Bulgaria)

UKRAINE Radio Ukraine International English: 2100 5905, 0000 and 0300 12040, 1100 15415. In the view of creation of the new international Broadcasting Company "Ukraine and Svit" there can be more serious changes in the program schedule (Alexander Yegorov, Kiev, Ukraine, *Rus-DX*)

U K [non] Laser Radio, which had been on 5935 for several weeks local Sunday evenings via Latvia, planned to move to a higher frequency for A-03, and Latvia chose 9520. But while waiting for antenna modifications, Laser noticed that two other stations were already using the frequency, Albania and R. Liberty! Turns out the Latvians had not coördinated it, so Laser would not use it, and also suspended the Sunday broadcast via WBCQ 9330 until this could be resolved (via Daniel Srebnick, *DXLD*) However, continued to put shows on internet via http://www.laserradio.net (Geoff Rogers, Laser Radio, via Robert Scaglione, South Italy, *shortwave* yahoogroup) Still no news on website as of April 21; how long can it take to find a clear frequency on 31m? And why blow off the NAm audience in the meantime? (gh)

[UK and non] BFBS schedule revised in April, one via Merlin, the other via CIS: 0300-0400 7260 15795, 0400-0600 11975 15795, 0600-0700 15425 15795, 1400-1600 13860 17895, 1600-1800 13860 17635, 1800-2000 6015 13760 (Noel Green, England, DSWCI *DX Window*)

UNITED NATIONS [non] UN Radio A-03 via Merlin: English M-F 1730-1745 on 7150 South Africa to EAf, 15495 Skelton to ME, 17810 Ascension to W/CAf (via Alokesh Gupta, *DXLD*)

U S A On April 7, VOA began a new half-hour broadcast for Zimbabwe in Shona and Ndebele, weekdays 1700-1730 followed by VOA's current half-hour program to Zimbabwe in English, known together as *Studio 7* on 909 AM, 17895 and 13600 SW. VOA's Zimbabwe Broadcasting Project is funded by a grant from the U.S. Agency for International Development (VOA Press Release)

Charles Josey, 60, K4LNL, owner and operator of SW station WWBS, Macon, GA, died on February 28, according to obit in local paper (Ken W. English, UT, *DXLD*) Mr. Josey, retired from Philips Medical after 35 years, was chief engineer and owner of WWBS. He is survived by his wife, Jo Ann Josey of Macon (*The Telegraph*, Macon) Mrs Josey was often heard on the WWBS air, but unheard subsequently on the minimal schedule of Sat & Sun 0000-0200 on 11900; did the station go with him? (gh)

Planned A-03 schedule for KIMF, Piñón NM: 2245-1800 5835, 1800-2245 11865, both 50 kW 135 degrees to southern NAm (GJA Inc. site via Jim Moats, *World of Radio*) Still not on the air; quite low frequency for most of daytime as well as night, obviously aimed only at nearby Mexico then (gh)

KVOH at 1930 with distorted spurs at multiples 146 kHz above and below fundamental 17775 in Spanish religion (David Hodgson, TN, *DX Listening Digest*) 17921, 18067, 18213; 17629, 17483, 17337 (gh) Those 3 sets above and below are what I could hear with an S9+ fundamental here in Nashville. I guess at the transmitter site they could extend several more multiples (David Hodgson, TN, *ibid.*) At only 28 km from the KVOH site, spurs are intermittent, heard one day but not the next. Transmitter is an RCA BHF-100A Ampliphase formerly at HCJB. I often note some distortion on music and speech on KVOH (Donald Wilson, North Hollywood CA, *ibid.*)

We are aware of the 5015 spur [5085/5050]; pretty sure this is from a neighbor's barn! The tin roof is somehow mixing and re-radiating. The roof panels are galvanized tin with just the amount of rust to enhance the spur! The tin panels are resonant at 5 MHz (figures!!) The other spur has been eliminated; this one was coming from the barb wire fence down the road, with the solid state fence charger that puts a charge on the fence to control livestock. FCC is aware of this and we have been given exceedingly wide latitude to resolve (Dave Frantz, WWRB)

Planet World News on WBCQ expanded to M-Sa 1945-2000 and an evening edition at 0415-0430 Tu-F, the latter including a techno-minute, and E-mail input from listeners on these topics: Tue Arts, Wed Health, Thu Science, Fri Politics. Send to news@wbcq.us Plus Thu 2100-2130 the weekly *Planet World News Roundup*, says Michael Ketter. [Frequency not specified, but 7415, and sometimes also 9330-CLSB] Most of the deadbeat broadcasters on WBCQ which have run up a big bill and skip, leaving us holding the bag, are religious. (Allan Weiner, *Worldwide*) On March 4, FCC granted construction permit for WBCQ to add another transmitter and antenna (Donald Wilson, *DX Listening Digest*)

[and non] *World of Radio* new schedule on RFPI 7445 (and/or 15039 if reactivated): Sat 0130, 0800, 2330, Sun 0530, Mon 0030, 0700, Wed 0100, 0730; also 6 hours earlier and later than these times when 7445 is heard only in Central America. Unconfirmed on WJIE 7490 and/or 13595: M-F 0730, Sat 0930, Sun 0200, 1030, 1630. *WJIE Update* rescheduled to UT Sun 0245-0300 only on 7490 and/or 13595 (gh)

[non] Radio Africa International A-03 (The United Methodist Church) via DTK Germany daily to Af: English 1700-1900 on 13820 and 15715; French 0400-0600 13810, 0600-0800 15435. Radio Africa International, 475 Riverside Drive Room 1374, New York NY 10115, USA. E-Mail: radio@gbgm-umc.org (via Alokesh Gupta, India)

UZBEKISTAN R. Tashkent, A03 English: 0100-0130 9715, 7190; 1200-1230 and 1330-1400 17775, 15295, 9715, 7285; 2030-2100 and 2130-2200 11905, 9545, 5025 (via Alexander Polyakov, Tashkent via Bernd Trutenau, Lithuania, *EDXP*)

VATICAN [and non] A03 Vatican R. overseas relays are:

6020	1230-1315	Palauig, Philippines: Mandarin
6210	1610-1645	Samara, Russia: Russian
7305	2200-2245	Irkutsk, Russia: Mandarin
12055	1315-1345	Tchita, Russia: Vietnamese
12065	1450-1600	Tashkent, Uzbekistan: Hindi, Tamil, Malayalam, English

Reciprocal HF relays of V. of Russia via Vatican:

9450	2100-2130	French
11825	0100-0200	English (Bob Padula, *EDXP*)

WALES [non] Wales R. Int'l A-03 via Merlin: Fri 2030-2100 7325 Skelton to Eu; Sat 0200-0230 9795 Rampisham to NAm; Sat 1230-1300 17845 Rampisham to Oceania (via Alokesh Gupta, *DXLD*)

ZAMBIA Christian Voice, A-03 to Africa: English: 4965 1500-2200, 6065 0400-0600; 9865 0600-1500; Portuguese 15365 2000-2300 (via Alokesh Gupta, India) Where frequencies must end in -65

Until the Next, Best of DX and 73 de Glenn!

Broadcast Logs

Gayle Van Horn

gaylevanhorn@monitoringtimes.com

0009 UTC on 6949.9
PIRATE: Capt. Morgan. Bits of James Bond and Twilight Zone themes and pop music. SIO 2+42+ item on the Armless Restaurant Patron. **Captain Ron SW** 6950, 0113-0135+. **He-Man Radio**, 6955 USB, 2356-0010; **WMPR** 6955 USB, 0204. (Harold Frodge, Midland, MI)

0030 UTC 2390
MEXICO: Radio Huayacocotla Musical show *Banda Alegre*. Signal best in LSB. Closing with children's national anthem chorus at 0058. Mexico's **Radio Mil** 6010, 0845. *Romance y Recuerdos* musical program of Latin pops. Time check to ID. (Fernando Garcia, Baltimore, MD).

0045 UTC on 7400
BULGARIA: Radio Bulgaria. National news and IDs to commentary and current affairs segment. SINPO 44434. (Duane Hadley, Bristol, TN) 9500 // 7400, 2200. (Bob Fraser, Cohasset, MA) *2000-2059*, 5800. (Kraig Krist-KG4LAC, Annandale, VA) 0040-0101, 9400 (Joe Wood, Gray, TN)

0045 UTC on 13695
THAILAND: Radio Thailand. News items in English/Thai service, followed by business and sports roundup. Station ID at 0059. (Stewart MacKenzie, Huntington Beach, CA) Audible 9530, 1405-1420+. (Hadley, TN) 0302, 15460 English service. (Gil Aiken, WA) 9530, 1401-1410. (Frodge, MI)

0057 UTC on 11815
SPAIN: Radio Exterior España. Interval signal, time pips to sign-on announcements. Spanish service // 6055 opera and classical music program. (Wood, TN) 21610 beamed to the Middle East at 1755 with Arabic service. (Jonathan V. Siverling WB3ERA, Fairfax, VA) REE/Radio Tres 11625, 2100. Gypsy music program to ID/ Mediterranean program in Radio Tres for Equatorial Guinea to 2200*. (Garcia, MD)

0102 UTC on 5020
PERU: Radio Horizonte. Spanish. Santo Rosario prayer. SINPO 24332. Peru's **Radio Superior** 5300.1, 0108; **Radio Difusora** 6536.2, 0125+; **Radio Ondas del Pacifico** 13565.6, 0225+. (Arnaldo Slaen, Buenos Aires, Argentina) **Radio San Antonio** 3375.15, 1049-1102+; **Radio Imperio** 4388.9, 1102-1130+; **Ondas del Rio Mayo** 6797.5, 2330-2343+. (Frodge, MI) 0015, 6798 religious programming. (Garcia, MD)

0130 UTC on 6155
UNITED KINGDOM: RTE. Identification to news on public transport strike in Dublin. Local time check to item on parliamentary proceedings. **BBC Falkland Island** service via Rampisham 11680, 2130 with segment on economy and NASA studies of Antarctic ice caps. (Garcia, MD)

0200 UTC on 9560
SOUTH KOREA: Radio Korea Intl. Station ID to report on trade agreement with Chile. (William McGuire, Cheveryl, MD)

0200 UTC on 5960
JAPAN: Radio Japan. Signal time pips to "NHK" identification and report on Iraq. (McGuire, MD)

0340 UTC on 3360
GUATEMALA: LV de Nahuala. Spanish. Instrumentals to regional style xylophones. Canned ID and chat to 0357*. Guatemalan **Radio Cultural** 3300, 0958-1035. (Scott Barbour, NH/NASWA)

0445 UTC on 7265
GERMANY: Sudwestrundfunk. German and English pops to German service ID and news update on Iraq. (Patrick Martin, Seaside, OR)

0455 UTC on 3280
ECUADOR: LV del Napo. Spanish. Nice ballads to piano music. Station ID with SIO 343. (Hadley, TN) Ecuador's **Radio Federacion** 4960, 0036+, SINPO 25442. (Slaen, ARG) **HCJB** 15140, 2245 (Frodge, MI; Fraser, MA; Jill Dybka KF42E), Kingston Springs, TN) **Radio Oriental** 4780v, 1030; **La Voz del Upano** 5040, 1100. **Radio Buen Pastor** 4814, 1002. (Garcia, MD)

0930 UTC on 3600
CUBA: Radio Rebelde. Spanish ID audible on harmonic 6x600. Radio Habana 6180, 1115 with *taped show Cafe Cuba* from Tropical nightclub (Garcia, MD)

1218 UTC on 9645.7
BRAZIL: Radio Bandeirantes. Portuguese. Announcement about Sao Paulo and Sambodromo. Station ID to Banco Real ads, local time check, weather report and press headlines. SINPO 44444. (Slaen, ARG) **Radio Aparecida** 6135.04, 2308-2320+; **Radio Clube Paranaense** 6039.9, 2322-2329+; **Radio Educadora Bahia** 6020, 2350-2357+. (Frodge, MI) **Radio Central** 4985, 0100-0130. (Tom Banks, Dallas, TX) 11815, 0700 (Garcia, MD) **Radio Nacional da Amazonia** 6180, 2250-2302. (Wood, TN; 9655, 0845 (Garcia, MD) **Radio Cancao Nova** 9675, 2230; **Radio Nova Visao** 9530, 2230; **Radio Nacional Macapa** 4915, 2300. (Garica, MD) **Radio** Senado de la Nacion 5990, 1016-1026. (Slaen, ARG).

1305 UTC on 6378.25
VIET NAM: Lai Chau Radio. Vietnamese talk to regional music at 1331. Signal distorted with an S7 noise level and frequency drifting. Station **Cao Bang** presumed on 6495.3 at 1336-1400*. Drum/flute music to closing announcements at 1357-1400*. Frequency varying wildly from 6495.0-6495.4. (John Wilkins, Wheat Ridge, CO/NASWA Flash Sheet)

1420 UTC on 15365
ROMANIA: Radio Romania Intl. Business Update to station ID. Report on the *Romanian Post*, the nation's postal system. (Krist, VA)

1510 UTC on 17630
GABON: Africa # 1. French talk and several station identifications. Weather and sports roundup to Afro/French pop tunes and phone-in. (Thomas M. Gibson, Spokane, WA)

1600 UTC on 15395
UAE: Emirates Radio. *Arab Scientists* segment with minimal signal quality, SINPO 23322. Radio Finland's Finnish service distorted signal after 1628 on 15400, until their 1700 sign-off. (Siverling, VA)

1602 UTC on 15820 LSB
ARGENTINA: Radio Rivadavia. Sports transmission and discussion on *National Tourism*, SINPO 44444. (Slaen, ARG) **Radio Diez** 15280, 1332-1340. (Frodge, MI).**Radio Continental** 9080 LSB, 1130. ID "Servicio informativo Continental" to soccer results. **Radio Ciento Uno** 15820 LSB, 2200. (Garcia, MD)

2014 UTC on 15476.2
ANTARTICA: Radio Nacional Archangel San Gabriel/Argentine Base Esperanza. Spanish. Commentary about local polar bears to weather report. Spanish folk music to station ID. (Slaen, ARG)

2200 UTC on 9990
EGYPT: Radio Cairo. Short story segment, *Following a Beautiful Woman*. (Fraser, MA) 12050 Arabic, 0000. (McGuire, MD)

2256 UTC on 15120
NIGERIA: Voice of. Newscast to lifestyle commentary amid moderate fading. Station ID to 2300*. (Aiken, WA) **Radio Nigeria** 4770, 2249-2259*. (Frodge, MI)

2301 UTC on 5009.8
DOMINICAN REP.: Radio Puebla. Latin American music to phone calls with ID preceding each call. (Frodge, MI) **Radio Cristal** 5010, 0035. (Dybka, TN).

2304 UTC on 6139.8
COLOMBIA: Radio Melodia. Formal station identification and frequency announcement in Spanish. Series of local ads and phone-calls from listeners and ID at 2330. (D'Angelo, PA/NASWA) **La Voz de tu Consencia** 6009, 0342-0350. (Frodge, MI)

2329 UTC on 6020
TURKEY: Voice of. Middle Eastern music to travel segment on Anatolia. Closing announcements to ID, schedule and address. SIO 433 for 2349* uncovering Brazilian station. (Frodge, MI) 7300, 0336 (MacKenzie, CA) 17815, 1330. (Fraser, MA)

2352 UTC on 17835.4
EL SALVADOR: Radio Imperial. Spanish. Lively Latin vocals to female's ID and male frequency quote. Continuous music ballads and religious tunes to abrupt 0012*. Poor signal with deep fades. (D'Angelo, PA/NASWA) Audible Spanish 2045-2214, SIO 1+31+. (Frodge, MI)

Thanks to our contributors – Have you sent in YOUR logs? Send to Gayle Van Horn, c/o Monitoring Times (or e-mail gaylevanhorn@monitoringtimes.com) ***Please note:*** *paper strips and cassette recordings will no longer be accepted. English broadcast unless otherwise noted.*

The QSL Report

Gayle Van Horn

gaylevanhorn@monitoringtimes.com

Don't Sweat It!

Okay....summer is here. By now you've noticed radio conditions have changed, especially if you are a medium wave DXer! Noise is now a problem, and will remain a persistent complaint for those of us "just trying for one more station." To put it quite simply – the ionosphere of summer is not kind to broadcast band DXing! But, don't let that dilemma discourage you, for now is an ideal time to focus on local or stateside stations previously not logged (or ignored).

This month's QSL focus is medium wave and we have a terrific selection. Don't forget to enclose return postage stamps or currency in your letter to the station Manager or Chief Engineer. Stations usually reply with an assortment of promotional "goodies," and most answer within a few days or weeks. Have you considered an email report? Let us know your summertime DX results.

MEDIUM WAVE

Canada

CBK, Watrous, Saskatchewan, 540 kHz AM. Partial data CBC QSL card, station info sheet and letter signed by Dave Wogg. Received in 20 days for an AM report and one US dollar (returned) Station address: CBC, 2440 Broad St., Regina SK Canada S4P 4A1. (Patrick Griffith-CBT, Westminster, CO)

CKRM Regina, Saskatchewan, Canada, 620 kHz AM. Partial data letter signed by Willy Cole-Program Director. Received in 15 days for an AM report. Station address: 2060 Halifax St., Regina S4P 1T7 Canada. (Griffith, CO)

Germany

Heissischer Rundfunk (HR) 594 kHz AM. Partial data German/English QSL card unsigned, plus station stickers and frequency/program guide. Received in seven days for a German AM report and no return postage. Station address: Hessischer Rundfunk, Bertramstrabe 8, 60320 Frankfurt. (Martin, Schoech, Merseburg, Germany/HCDX) **http://www.hr-online.de**

Evangeliumsrundfunk 1539 kHz AM. Partial data German QSL card of studio building, unsigned. Received in 11 days for a German AM report and no return postage. Station address: Evangeliumsrundfunk, Postfach 1444, 35573 Wetzlar. Return address also given as; Bayerischer Rundfunk, Technische Information, D-80300 Munchen, Germany. (Schoech, Germany)

Guatemala

Radio VEA Guatemala, 1570 kHz AM. Verification letter signed by Jose Adonias Corado-Gerente, Apartado 1213, Guatemala. Received in 79 days for an AM report. Station email address: **radio@yahoo.com.** (Hans Dieter Bushau, Hildesheim, Germany).

Mexico

XESURP, Tijuana 540 kHz AM. Prepared QSL card returned with illegible signature. Received in eight days for an AM report to; Tom White-Chief Engineer. 1500 Cotner Ave., Los Angeles, CA 90025. (Martin, OR)

United States

KAXX, 1020 kHz AM. Prepared QSL card returned and verified by Matt Sherman-Program Director. Received in 320 days after several attempts. Station address: 2509 Eide St., Suite 6, Anchorage, AK 99503. Ph." 907-277-5652. Alaska QSL # 52. (Martin, OR)

KHCM, 940 kHz AM. Verification letter signed by Katie Dimmitt-Adm. Assistant, plus stickers. Received in 75 days for an AM report. Station address: 560 N. Nimitz Hwy. Ste. 109, Honolulu, HI 96817. (Martin, OR)

KHPY, 1670 kHz AM. Verification letter signed by D.L. Van Voorhis-Owner. Received in 130 days for a taped report. Station address: 24490 Sunnymeade Bl#215, Moreno Valley, CA 92553. (Martin, OR)

KLT, 670 kHz AM. Full data prepared AM verification letter returned and initialed by "Ed". Received in five days for an SASE. Station address: Hope For Today Ministries, 2401 Alcott St., Denver, CO 80211 (Mark Redfox, Albuquerque, NM)

KMIN, 980 kHz AM. Partial data letter signed by Derek Underhill and station souvenirs. Station address: 733 E. Roosevelt Ave., Grants, NM 87020. (Griffith, CO) **http://www.kmin960.com/.**

KMOX, 1120 kHz AM. Full data verification on station letterhead, signed by Manager-Technical Operations, plus station bumper sticker. Received in 36 days for an AM report, two postage stamps and address label. Station address: One Memorial Dr., St. Louis, MO 63102-2498. **http:www. kmox.com/**. (J.E. Russell, Albany, NY)

KOZN 1620 kHz AM. Partial data letter signed by Neil Nelkin-Program Director, plus *The Zone* window sticker. Received in 28 days for an AM report and one dollar (returned). Station address: 5011 Capitol Ave., Omaha, NE 68132. (Griffith, CO) **http://www.1620thezone.com/.**

KTFH, 1680 kHz AM. Full data verification letter for station's testing transmission, signed by Richard B. Harris-Corp. Projects Engineer. Received in 18 days for an AM report. Station address: 2825 2nd Ave. # 550, Seattle, WA 98121. (Martin, OR)

KXTR, 1660 kHz AM. Partial data color Beethoven sheet signed by Ken Wolf-Chief Engineer. Received in 12 days for an AM report, one US dollar and an address label (used for reply). Station address: 4935 Belinder Rd., Westwood, KS 66205. (Bill Wilkins, Springfield, MO)

WCCO, 830 kHz AM. Full data station map/logo card signed by Chief Engineer. Received in 15 days for an AM report. Station address: 625 Second Avenue South, Minneapolis, MN 55402. (Frank Hillton, Charleston, SC) **http://www. wcco.com.**

WGN, 720 kHz AM. Full data verification on station letterhead signed by James J. Carollo, plus color QSL card, station booklet and stickers. Received in 26 days for an AM report and two postage stamps (returned). Station address: 630 N. McClure Court, Chicago, IL 60611. (Sam Wright, Biloxi, MS) **http://www. wgnradio.com**

WHAS, 840 kHz AM. No data preprinted studio building card unsigned. Received in seven days for an AM report and two postage stamps. Station address: 520 West Chestnut St., Louisville, KY 40202. (Tom Banks, Dallas, TX) **http://www.whas11.com/**

WHO, 1040 kHz AM. Full data Owl logo card unsigned, plus coverage map. Received in ten days for an AM report. Station address: 1801 Grand Ave., Des Moines, IA 50309. (Brian Bagwell, St. Louis, MO)

WJR, 760 kHz AM. Full data station logo card signed by Operations Manager, plus bumper sticker, personal note and coverage map. Station address: 2100 Fisher Bldg., Detroit, MI 48202. (Bagwell, MO) **http://www.wjr.net/**

WOWO, 1190 kHz AM. Full data red colored station logo card unsigned. Received in six days for an AM report. Station address: 2915 Maples Rd., Fort Wayne, IN 46816. (Wright, MS) **http://www.wowo.com.**

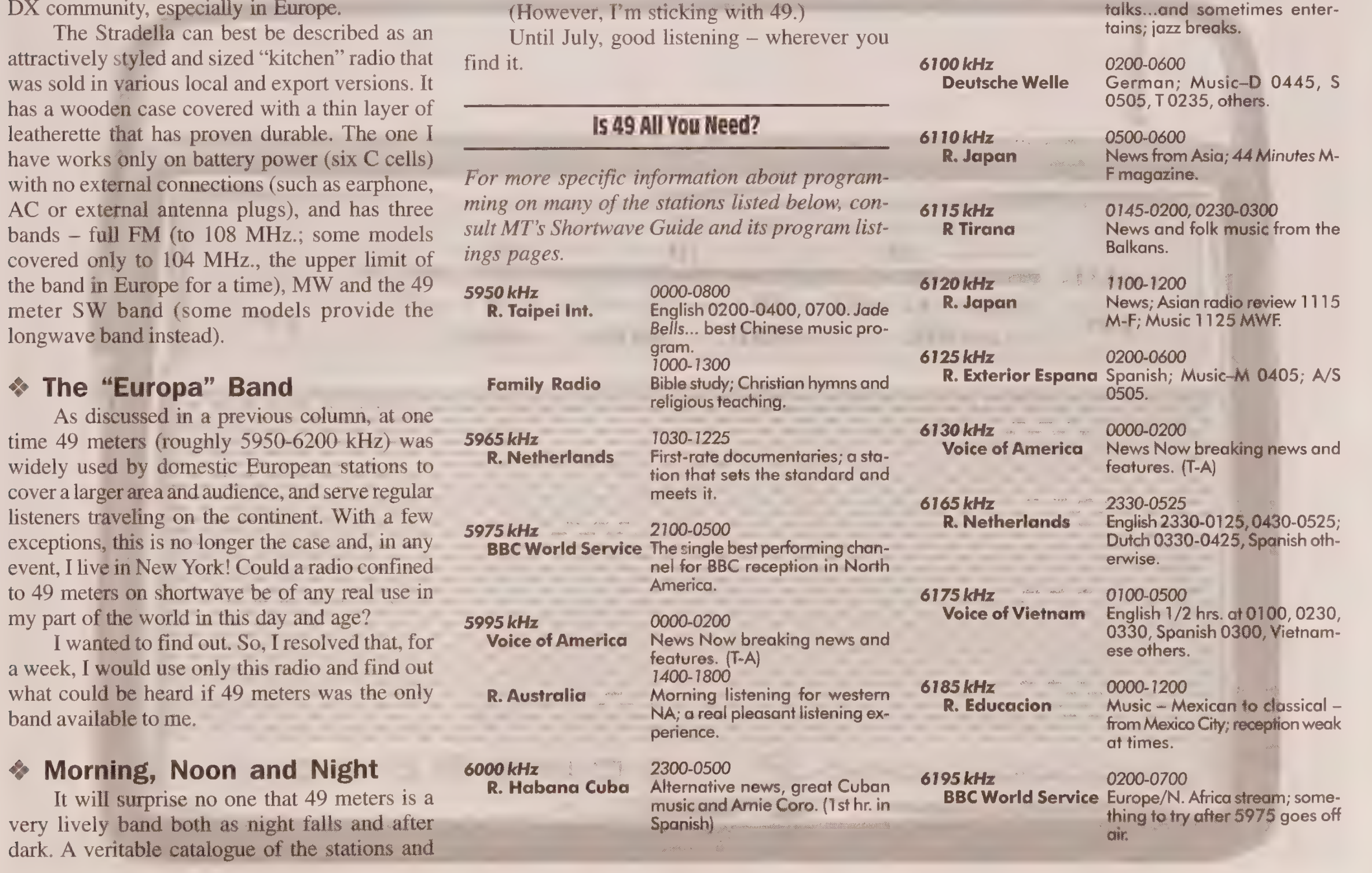
WSB, 750 kHz AM. Full data verification on station letter signed by Program Director, plus frig magnets, coverage map and stickers. Received in 12 days for an AM report. Station address: 1601 West Peachtree St., Atlanta, GA 30909-2663. (Duane Hadley, Bristol, TN) **http://www.wsbradio.com/**

Programming Spotlight

John Figliozzi
johnfigliozzi@monitoringtimes.com

Just Stickin' with 49

photo credit - Patricia B. Figliozzi



At an ODXA (Ontario DX Association) convention a couple of years back, a conversation centered around the dismay some were feeling over the decline in shortwave receiver manufacturers and the dearth of new radios on the market. Harold Sellers, a founder of the ODXA and someone who definitely takes the long view in matters like these, simply offered, "Maybe some of the future of our hobby can be found in experiencing its past."

That statement has stayed with me. When finances permit, I look around for markers of that past – older shortwave publications, an ad or two, a recording of a station no longer with us, an interesting old radio here and there. Some of the stuff I keep and some I pass along after a time.

One of my more recent purchases was a Nordmende Stradella radio of mid-1960s vintage. In the '60s and '70s, this German manufacturer – which goes back to pre-WWII years – produced several portable models, like the Galaxy and the Globetrotter, that were well respected by the SWL/DX community, especially in Europe.

The Stradella can best be described as an attractively styled and sized "kitchen" radio that was sold in various local and export versions. It has a wooden case covered with a thin layer of leatherette that has proven durable. The one I have works only on battery power (six C cells) with no external connections (such as earphone, AC or external antenna plugs), and has three bands – full FM (to 108 MHz.; some models covered only to 104 MHz., the upper limit of the band in Europe for a time), MW and the 49 meter SW band (some models provide the longwave band instead).

❖ The "Europa" Band

As discussed in a previous column, at one time 49 meters (roughly 5950-6200 kHz) was widely used by domestic European stations to cover a larger area and audience, and serve regular listeners traveling on the continent. With a few exceptions, this is no longer the case and, in any event, I live in New York! Could a radio confined to 49 meters on shortwave be of any real use in my part of the world in this day and age?

I wanted to find out. So, I resolved that, for a week, I would use only this radio and find out what could be heard if 49 meters was the only band available to me.

❖ Morning, Noon and Night

It will surprise no one that 49 meters is a very lively band both as night falls and after dark. A veritable catalogue of the stations and programs heard with ease appears in the sidebar. However, before the sun gets too high in the sky, a few good morning options also emerge, including Radio Netherlands, Radio Japan, Radio Australia and Family Radio. Even during the day, if conditions are right or your listening location is in reasonable proximity to Toronto, you can listen to CFRB 1010 relayed via CFRX's 1 kilowatt transmitter on 6070 kHz while waiting for the band to open up again in the evening.

❖ 49 is Fine

So, in summation, I am quite impressed with the performance of 49. Intently focusing there gave me the opportunity to really examine both the stations occupying the band and the performance of the Stradella, both of which provided more than ample satisfaction.

And there is absolutely no truth to the scurrilous rumor that my fascination with this band has anything whatsoever to do with the fact that I turn 50 this month!

(However, I'm sticking with 49.)

Until July, good listening – wherever you find it.

Is 49 All You Need?

For more specific information about programming on many of the stations listed below, consult MT's Shortwave Guide and its program listings pages.

5950 kHz **R. Taipei Int.**	*0000-0800* English 0200-0400, 0700. *Jade Bells...* best Chinese music program.
Family Radio	*1000-1300* Bible study; Christian hymns and religious teaching.
5965 kHz **R. Netherlands**	*1030-1225* First-rate documentaries; a station that sets the standard and meets it.
5975 kHz **BBC World Service**	*2100-0500* The single best performing channel for BBC reception in North America.
5995 kHz **Voice of America**	*0000-0200* News Now breaking news and features. (T-A)
R. Australia	*1400-1800* Morning listening for western NA; a real pleasant listening experience.
6000 kHz **R. Habana Cuba**	*2300-0500* Alternative news, great Cuban music and Arnie Coro. (1st hr. in Spanish)
6020 kHz **R. Australia**	*1100-1400* Best in western NA, but for true early risers; a station with great variety.
6030 kHz **R. Marti**	*2200-0400* Lots of great Cuban popular music when jamming doesn't interfere.
6055 kHz **R. Exterior Espana**	*0100-0600* Spanish; Music–M-A 0105; M 0405; A/S 0505
6065 kHz **Family Radio**	*0100-0500* Bible study; Christian hymns and religious teaching.
6070 kHz **CFRB Toronto**	*24 hours* Newstalk radio; only 1kW but heard daytime in much of North America.
6075 kHz **Deutsche Welle**	*0000-0600* German; Music–D 0045/0445, S 0505/M 0105, T 0235, others.
6090 kHz **Caribbean Beacon**	*2200-1000* Dr. Gene Scott talks and talks...and sometimes entertains; jazz breaks.
6100 kHz **Deutsche Welle**	*0200-0600* German; Music–D 0445, S 0505, T 0235, others.
6110 kHz **R. Japan**	*0500-0600* News from Asia; *44 Minutes* M-F magazine.
6115 kHz **R Tirana**	*0145-0200, 0230-0300* News and folk music from the Balkans.
6120 kHz **R. Japan**	*1100-1200* News; Asian radio review 1115 M-F; Music 1125 MWF.
6125 kHz **R. Exterior Espana**	*0200-0600* Spanish; Music–M 0405; A/S 0505.
6130 kHz **Voice of America**	*0000-0200* News Now breaking news and features. (T-A)
6165 kHz **R. Netherlands**	*2330-0525* English 2330-0125, 0430-0525; Dutch 0330-0425, Spanish otherwise.
6175 kHz **Voice of Vietnam**	*0100-0500* English 1/2 hrs. at 0100, 0230, 0330, Spanish 0300, Vietnamese others.
6185 kHz **R. Educacion**	*0000-1200* Music – Mexican to classical – from Mexico City; reception weak at times.
6195 kHz **BBC World Service**	*0200-0700* Europe/N. Africa stream; something to try after 5975 goes off air.

Shortwave Guide

How to Use the Shortwave Guide

0000-0100 twhfa USA, Voice of America 5995am 6130ca 7405am 9455af

① ② ⑤ ③ ④ ⑥ ⑦

Convert your time to UTC.

Broadcast time on ① and time off ② are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Daylight Time) 4, 5, 6 or 7 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each page.

Note that all *dates*, as well as times, are in UTC; for example, a show which might air at 0030 UTC *Sunday* will be heard on *Saturday* evening in America (in other words, 8:30 pm Eastern, 7:30 pm Central, etc.).

Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. On the top half of the page English broadcasts are listed by UTC time on ① , then alphabetically by country ③, followed by the station name ④. (If the station name is the same as the country, we don't repeat it, e.g., "Vanuatu, Radio" [Vanuatu].)

If a broadcast is not *daily*, the days of broadcast ⑤ will appear in the column following the time of broadcast, using the following codes:

Day Codes	
s/S	Sunday
m/M	Monday
t/T	Tuesday
w/W	Wednesday
h/H	Thursday
f/F	Friday
a/A	Saturday
D	Daily
mon/MON	monthly

In the same column ⑤, irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

Choose the most promising frequencies for the time, location and conditions.

The frequencies ⑥ follow to the right of the station listing; all frequencies are listed in kilohertz (kHz). Not all listed stations will be heard from your location and virtually none of them will be heard all the time on all frequencies.

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions. But they can also change in response to short-term conditions, interference, equipment problems, etc. Our frequency manager coordinates published station schedules with confirmations and reports from her monitoring team and *MT* readers to make the Shortwave Guide up-to-date as of one week before print deadline.

To help you find the most promising signal for your location, immediately following each frequency we've included information on the target area ⑦ of the broadcast. Signals beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible.

Target Areas	
af:	Africa
al:	alternate frequency (occasional use only)
am:	The Americas
as:	Asia
au:	Australia
ca:	Central America
do:	domestic broadcast
eu:	Europe
irr:	irregular (Costa Rica RFPI)
me:	Middle East
na:	North America
om:	omnidirectional
pa:	Pacific
sa:	South America
va:	various

Choose a program or station you want to hear.

Selected programs for prime listening hours appear following the frequencies – space does not permit 24 hour listings nor can every station be listed. However, listings for the most popular stations and selected lesser-known stations illustrate the variety available on shortwave. The format of the listings alternates among three different styles – by station, by genre and by day – month by month. Times listed are approximate and programs are subject to change.

The program listings emphasize broadcasts targeted to North America. In most cases, the stations and programs listed should be readily receivable in North America using a portable radio. Most broadcasters produce one broadcast in English per day that is repeated over a 24 hour period to all areas. If you are able to listen to transmissions to other areas of the world during "non-prime time" hours, referring to the prime time listings for those stations will likely be helpful in determining what programs will be broadcast.

Occasionally, a program or station listing may be followed by a reference to another listing for the same program or station at a different time. This is done to conserve space and make it possible to provide more listings.

MT Monitoring Team

Gayle Van Horn
Frequency Manager
gaylevanhorn@monitoringtimes.com

John Figliozzi
Program Manager
johnfigliozzi@monitoringtimes.com

Mark Fine, VA
markfine@monitoringtimes.com

Program Highlights

John Figliozzi

The continuing transformation of the shortwave landscape continues apace with news concerning HCJB and Radio Austria International

HCJB "Reorients"

In a major development – both for its scope and its swiftness of implementation – the *Voice of the Andes* will have undergone a complete reorientation of its broadcast mission as of May 31. All broadcasts to North America and Europe will have ceased, with the sole remaining English language broadcast being a morning service to Central and South America.

The loss to listeners no longer served includes the demise of **DX Partyline**, a longstanding popular and important "meeting place" for the shortwave listening community, not to mention the silencing of one of the few sources of Latin American-based information on radio in English. One cannot help thinking that this is another in a series of missteps by longtime international broadcasters overreacting to acknowledged changes in ambient circumstances.

While I'm no expert on missionary broadcasting, it seems to this observer that, while a reexamination of the clearly bloated services to NA and Europe was certainly justified, the wholesale elimination of them and the over-narrowing of *HCJB*'s overall focus (which has been going on for some time), is shortsighted. Even an hour a day of news and information about Latin America could have been used to generate contributions to *HCJB* by informing overseas listeners about the problems confronting the region and *HCJB*'s role in addressing them. Now that source no longer exists.

Austrian Radio to Restructure

Effective July 1, 2003, R. Austria Int. (ROI) will have a new structure. The ORF (the parent corporation) domestic radio station *Österreich 1* will be broadcast on shortwave, replacing ROI's German service. The program mixture, consisting of information, cultural features, music, literature, education, science and religion, will be made available to Austrian expatriates and a global listening audience interested in Austria. In addition, there are (unspecified at press time) plans to offer programming in English beyond the occasional news bulletins broadcast by *Österreich 1*.

Shortwave Guide

0000 UTC - 8PM E / 7PM C / 5PM P

0000	0007		Sierra Leone, SLBS	3316do
0000	0015		Cambodia, National Radio Of	11940as
0000	0015		Japan, Radio	6145na 13650as 17810as
0000	0027		Czech Rep, Radio Prague Intl	7345na 9440na
0000	0030		Egypt, Radio Cairo	11725na
0000	0030	mtwhfa	Serbia & Montenegro, R Yugo	9580va
0000	0030		Thailand, Radio	9570af
0000	0030		UK, BBC World Service	3915as 11945as 17615as
0000	0030		USA, Voice of America	7215as 9770as 11760as 15185as 15290as 17740as 17820as
0000	0045		India, All India Radio	9705as 9950as 11620as 13605as
0000	0059		South Korea, R Korea Intl	15385am
0000	0100		Anguilla, Caribbean Beacon	6090am
0000	0100		Australia, ABC NT Alice Springs	2310irr 4835do
0000	0100		Australia, ABC NT Katherine	5025do
0000	0100		Australia, ABC NT Tennant Crk	4910do
0000	0100		Australia, Radio	9660pa 12080va 15240pa 15415as 17580pa 17750as 17775as 17795va 21725as
0000	0100		Canada, CBC Northern Service	9625do
0000	0100		Canada, CFRX Toronto ON	6070do
0000	0100		Canada, CFVP Calgary AB	6030do
0000	0100		Canada, CKZN St John's NF	6160do
0000	0100		Canada, CKZU Vancouver BC	6160do
0000	0100		Canada, Radio Canada Intl	9640as 15205as
0000	0100		Costa Rica, R for Peace Intl	7445am 15038va
0000	0100		Costa Rica, University Network	5030am 6150am 7375am 9725sa 11870am 13750na
0000	0100	a	Finland, Scandinavian Weekend R	5980va 11690va
0000	0100		Germany, Deutsche Welle	7130as 9505as 9825as
0000	0100		Guyana, Voice of	3291do 5950do
0000	0100		Malaysia, Radio	7295do
0000	0100		Namibia, NBC	3270af 3290af 6060af
0000	0100		Netherlands, Radio	6165na 9845na
0000	0100		New Zealand, Radio NZ Intl	17675pa
0000	0100		Russia, University Network	9940as
0000	0100		Sierra Leone, Radio UNAMSIL	6139af
0000	0100		Singapore, SBC Radio One	6150do
0000	0100	vl	Solomon Islands, SIBC	5020do 9545do
0000	0100		UK, BBC World Service	5970as 5975am 6195as 9410as 9740as 9825sa 11835am 11955as 12095sa 15280as 15310as 15360as 17790as
0000	0100		Ukraine, R Ukraine Intl	12040na
0000	0100		USA, Armed Forces Network	3903usb 4278usb 4319usb 4993usb 6350usb 6458usb 10320usb 12579usb 12689usb 13362usb
0000	0100		USA, KAIJ Dallas TX	13815va
0000	0100		USA, KTBN Salt Lk City UT	15590na
0000	0100		USA, KWHR Naalehu HI	17510as
0000	0100	twhfa	USA, Voice of America	6130am 7405am 9455am 9775am 11695am 13790am
0000	0100		USA, WBCQ Kennebunk, ME	7415na 9329na
0000	0100		USA, WBOH Newport NC	5920am
0000	0100		USA, WEWN Birmingham AL	5825na
0000	0100		USA, WHRA Greenbush ME	7580va
0000	0100		USA, WHRI Noblesville IN	5745va 7315am
0000	0100		USA, WINB Red Lion PA	12159am
0000	0100		USA, WJIE Louisville KY	7490am 13595am
0000	0100	sm	USA, WRMI Miami FL	9955am
0000	0100	twhfa	USA, WRMI Miami FL	7385na
0000	0100		USA, WRNO New Orleans LA	7355am
0000	0100		USA, WSHB Cypress Creek SC	7535am 9430sa
0000	0100		USA, WTJC Newport NC	9370na
0000	0100	sm	USA, WWBS Macon GA	11910na
0000	0100		USA, WWCR Nashville TN	3210na 5070na 7465na 13845na
0000	0100		USA, WWRB Manchester TN	5050na 5085na 6890na
0000	0100		USA, WYFR Okeechobee FL	6065na 9505na 15130sa
0000	0100	vl	Vanuatu, Radio	3945al 7260do
0000	0100		Zambia, Christian Voice	4965do
0000	0130		UAE, Gospel For Asia	6145as
0015	0100		Japan, Radio	6145na
0030	0100		Iran, VOIRI	9530na 11920na
0030	0100		Lithuania, R Vilnius	9855al 11690na
0030	0100	mtwhfa	Russia, Bible Voice BC	11975as
0030	0100		Sri Lanka, SLBC	6005as 11905as 15745as
0030	0100		Thailand, Radio	15395na
0030	0100		UAE, AWR Africa	9720as 9810as
0030	0100		UAE, Bible Voice	7180as
0030	0100		UK, BBC World Service	9580as 17615as
0030	0100		USA, Voice of America	7215as 9770as 11760as 15185as 15290as 17740as 17820as
0038	0050		Croatia, Croatian Radio	9925sa
0045	0100		Pakistan, Radio	11650as 15625as
0055	0100		Italy, RAI Intl	9675am 11800am

0100 UTC - 9PM E / 8PM C / 6PM P

0100	0115		Italy, RAI Intl	9675na 11800am
0100	0115		Pakistan, Radio	11650as 15625as
0100	0120		Kyrghyz, Kyrghyz Radio	4010as 4795as
0100	0125		Netherlands, Radio	6165na 9845na
0100	0127		Czech Rep, Radio Prague Intl	6200na 7345na
0100	0127		Vietnam, Voice of	6175na
0100	0128		Hungary, Radio Budapest	9590na
0100	0130	s	Germnay, Universal Life	9435as
0100	0130		Slovakia, R Slovakia Intl	5930na 6190ca 9440sa
0100	0130		UAE, Gospel For Asia	6145as
0100	0130		Uzbekistan, Radio Tashkent	7190as 9715as
0100	0156		China, China Radio Intl	9580na 9790na
0100	0156		North Korea, Voice of	3560as 6195as 6520am 7140as 7580am 9345as 11735am
0100	0200		Anguilla, Caribbean Beacon	6090am
0100	0200		Australia, ABC NT Katherine	5025do
0100	0200		Australia, ABC NT Tennant Crk	4910do
0100	0200		Australia, Radio	9660pa 12080va 15240pa 15415as 17580pa 17750as 17795va 21725as
0100	0200		Canada, CBC Northern Service	9625do
0100	0200		Canada, CFRX Toronto ON	6070do
0100	0200		Canada, CFVP Calgary AB	6030do
0100	0200		Canada, CKZN St John's NF	6160do
0100	0200		Canada, CKZU Vancouver BC	6160do
0100	0200		Canada, Radio Canada Intl	9755am 15170am 15305am
0100	0200		Costa Rica, R for Peace Intl	7445am 15038va
0100	0200		Costa Rica, University Network	5030am 6150am 7375am 9725sa 11870am 13750na
0100	0200		Cuba, Radio Havana	6000na 9820na 11705usb
0100	0200	a	Finland, Scandinavian Weekend R	5980va 11690va
0100	0200		Guyana, Voice of	3291do 5950do
0100	0200		Indonesia, Voice of	9525va 11785as
0100	0200		Iran, VOIRI	9530na 11920na
0100	0200		Japan, Radio	11860as 11880me 15325as 17560me 17685pa 17810as 17835sa 17845as
0100	0200		Malaysia, Radio	7295do
0100	0200		Namibia, NBC	3270af 3290af 6060af
0100	0200		New Zealand, Radio NZ Intl	17675pa
0100	0200		Russia, University Network	9940as
0100	0200		Russia, Voice of	9665na 9725na 11825na 12000na 17595na
0100	0200		Sierra Leone, Radio UNAMSIL	6139af
0100	0200		Singapore, SBC Radio One	6150do
0100	0200	vl	Solomon Islands, SIBC	5020do 9545do
0100	0200		Sri Lanka, SLBC	6005as 11905as 15745as
0100	0200		UK, BBC World Service	5975am 6195as 9410as 9525sa 9825sa 11835am 11955as 12095sa 15280as 15310as 15360as 17790as
0100	0200		USA, Armed Forces Network	3903usb 4278usb 4319usb 4993usb 6350usb 6458usb 10320usb 12579usb 12689usb 13362usb
0100	0200		USA, KAIJ Dallas TX	5755va
0100	0200		USA, KJES Vado NM	7555na
0100	0200		USA, KTBN Salt Lk City UT	7505na
0100	0200		USA, KWHR Naalehu HI	17510as
0100	0200		USA, Voice of America	7115as 9635as 11705as 11725as 11820as 13650as 17740as 17820as
0100	0200	twhfa	USA, Voice of America	5995af 6130af 7405am 9455am 9775am 13790am
0100	0200		USA, WBCQ Kennebunk, ME	7415na 9329na
0100	0200		USA, WBOH Newport NC	5920am
0100	0200		USA, WEWN Birmingham AL	5825na
0100	0200		USA, WHRA Greenbush ME	7580va
0100	0200		USA, WHRI Noblesville IN	5745va 7315am
0100	0200		USA, WINB Red Lion PA	9320am
0100	0200		USA, WJIE Louisville KY	7490am 13595am
0100	0200	sm	USA, WRMI Miami FL	9955am
0100	0200	twhfa	USA, WRMI Miami FL	7385na
0100	0200		USA, WRNO New Orleans LA	7355am
0100	0200		USA, WSHB Cypress Creek SC	7535na 9430sa
0100	0200		USA, WTJC Newport NC	9370na
0100	0200		USA, WWCR Nashville TN	3210na 5070na 5935na 7465na
0100	0200		USA, WWRB Manchester TN	5050na 5085na 6890na
0100	0200		USA, WYFR Okeechobee FL	6065na 9505na 15060as
0100	0200	vl	Vanuatu, Radio	3945al 7260do
0100	0200		Zambia, Christian Voice	4965do
0105	0112		Croatia, Croatian Radio	9925na
0130	0140		Libya, Voice of Africa	15435af 21695af
0130	0200		Australia, Voice International	17775as
0130	0200		Iraq, Radio Iraq Intl	6175irr 9687irr 11787irr
0130	0200		Sweden, Radio	9435va 9495na
0130	0200		UK, RTE Radio	6155ca
0130	0200		USA, Voice of America	7115as 9635as 11705as 11725as 11820as 13650as 17740as 17820as

SELECTED PROGRAMMING BEGINS ON PAGE 55

0130	0200	twhfa	USA, Voice of America 7405am	9775am	13740am
0140	0200		Vatican City, Vatican Radio	9650as	12055as
0145	0200		Albania, Radio Tirana Intl	6115na	7160eu

0200 UTC - 10PM E / 9PM C / 7PM P

0200	0210		Bangladesh, Bangla Betar	4882as	
0200	0230	sm w fa	Belarus, Radio Belarus Intl	5970eu	7210eu
0200	0230		Iran, VOIRI9530na 11920na		
0200	0230		UAE, Bible Voice 9610as		
0200	0230	a	UK, Wales Radio Intl 9795na		
0200	0230		USA, KJES Vado NM 7555na		
0200	0256		North Korea, Voice of 4405as	9325as	11335as
0200	0256		Romania, R Romania Intl	9510na	11940na
			15105as 17720as		
0200	0256		South Korea, R Korea Intl	9560as	11810as
			15575na		
0200	0257		Canada, Radio Canada Intl	15510as	17860as
0200	0300		Anguilla, Caribbean Beacon	6090am	
0200	0300	twhfa	Argentina, RAE 11710am		
0200	0300		Australia, ABC NT Alice Springs	2310irr	4835do
0200	0300		Australia, ABC NT Katherine	5025do	
0200	0300		Australia, ABC NT Tennant Crk	4910do	
0200	0300		Australia, Radio 9660pa	12080va	15240pa
			15415as 15515va 17580pa	17750as	21725as
0200	0300		Austria, AWR Europe 9820as		
0200	0300		Bulgaria, Radio 9400na	11900na	
0200	0300		Canada, CBC Northern Service	9625do	
0200	0300		Canada, CFRX Toronto ON	6070do	
0200	0300		Canada, CFVP Calgary AB	6030do	
0200	0300		Canada, CKZN St John's NF	6160do	
0200	0300		Canada, CKZU Vancouver BC	6160do	
0200	0300		Costa Rica, R for Peace Intl	7445am	15038va
0200	0300		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	
0200	0300		Cuba, Radio Havana 6000na	9820na	11705usb
0200	0300		Egypt, Radio Cairo 11780na		
0200	0300	a	Finland, Scandinavian Weekend R 5980va		
0200	0300		Guyana, Voice of 3291do	5950do	
0200	0300		Malaysia, Radio 7295do		
0200	0300		Myanmar, Radio 7185do		
0200	0300		Namibia, NBC 3270af	3290af	6090af
0200	0300		New Zealand, Radio NZ Intl	17675pa	
0200	0300	as	Philippines, Radio Pilipinas	11885me	15120me
			15270me		
0200	0300	as	Russia, Bible Voice BC 17540as		
0200	0300		Russia, University Network	9940as	
0200	0300		Russia, Voice of 9665na	9725na	12000na
			17595na		
0200	0300		Sierra Leone, Radio UNAMSIL	6139af	
0200	0300		Singapore, SBC Radio One	6150do	
0200	0300	vl	Solomon Islands, SIBC 5020do	9545do	
0200	0300		Sri Lanka, SLBC 6005as	11905as	15745as
0200	0300		Taiwan, R Taipei Intl 5950na	9680na	11875as
			15320as 15465as		
0200	0300		UK, BBC World Service	5975am	6195eu
			9410eu 9750af 9825am	11835am	11760me
			11955as 12095sa 15280as	15310as	15360as
			17790as		
0200	0300		USA, Armed Forces Network	3903usb	4278usb
			4319usb 4993usb 6350usb	6458usb	10320usb
			12579usb 12689usb	13362usb	
0200	0300		USA, KAIJ Dallas TX 5755va		
0200	0300		USA, KTBN Salt Lk City UT	7505na	
0200	0300		USA, KWHR Naalehu HI	17510as	
0200	0300		USA, Voice of America 7115as	9635as	11705as
			11725as 11820as 13650as	17740as	17820as
0200	0300		USA, WBCQ Kennebunk, ME	7415na	9329na
0200	0300		USA, WBOH Newport NC	5920am	
0200	0300		USA, WEWN Birmingham AL	5825na	
0200	0300		USA, WHRA Greenbush ME	7580va	
0200	0300		USA, WHRI Noblesville IN	5745va	7315am
0200	0300		USA, WINB Red Lion PA	9320am	
0200	0300		USA, WJIE Louisville KY	7490am	13595am
0200	0300		USA, WRMI Miami FL 7385na		
0200	0300		USA, WRNO New Orleans LA	7355am	
0200	0300		USA, WSHB Cypress Creek SC	7535na	9430na
0200	0300		USA, WTJC Newport NC	9370na	
0200	0300		USA, WWCR Nashville TN	3210na	5070na
			5935na 7465na		
0200	0300		USA, WWRB Manchester TN	5050na	5085na
			6890na		
0200	0300		USA, WYFR Okeechobee FL	5985sa	6065na
			9505na 11855sa 15255sa		
0200	0300		Zambia, Christian Voice	4965do	
0200	1215		Cambodia, National Radio Of	11940as	
0215	0220		Nepal, Radio 3230as	5005as	6100as
			7164as		
0230	0257		Vietnam, Voice of 6175na		
0230	0258		Hungary, Radio Budapest	9590na	
0230	0300		Albania, Radio Tirana Intl	6115na	7160eu
0230	0300		Sweden, Radio 9495na		
0238	0250		Croatia, Croatian Radio	9925na	
0245	0300		UK, BBC World Service	9610af	
0250	0300		Vatican City, Vatican Radio	7305am	9605am

0300 UTC - 11PM E / 10PM C / 8PM P

0300	0310		Vatican City, Vatican Radio	7305am	9605am
			9660af		
0300	0327		Czech Rep, Radio Prague Intl	7345na	7385na
			9870na		
0300	0329		Belgium, Radio Vlaanderen Intl	15565am	
0300	0330		Egypt, Radio Cairo 11780na		
0300	0330	s twhfa	Mexico, Radio Mexico Intl	9705am	11770am
0300	0330	as	Philippines, Radio Pilipinas	11885me	15120me
			15270me		
0300	0330		South Africa, Channel Africa	6035af	
0300	0330		Thailand, Radio 15395na		
0300	0330		USA, Voice of America 6080af	7105af	7290af
			7340af 9575af 9885af	11835af	12080af
			17895af		
0300	0356		China, China Radio Intl	9690na	9790na
0300	0356		North Korea, Voice of 3560as	6195as	7140as
			9345as		
0300	0400		Anguilla, Caribbean Beacon	6090am	
0300	0400		Australia, ABC NT Alice Springs	2310irr	4835do
0300	0400		Australia, ABC NT Katherine	5025do	
0300	0400		Australia, ABC NT Tennant Crk	4910do	
0300	0400		Australia, Radio 9660pa	12080va	15240pa
			15415as 15515va 17580pa	17750as	21725as
0300	0400	vl	Botswana, Radio 3356do	4820do	7255do
0300	0400		Canada, CBC Northern Service	9625do	
0300	0400		Canada, CFRX Toronto ON	6070do	
0300	0400		Canada, CFVP Calgary AB	6030do	
0300	0400		Canada, CKZN St John's NF	6160do	
0300	0400		Canada, CKZU Vancouver BC	6160do	
0300	0400		Costa Rica, R for Peace Intl	7445am	15038va
0300	0400		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
0300	0400		Cuba, Radio Havana 6000na	9820na	11705usb
0300	0400	a	Finland, Scandinavian Weekend R 5980va		
0300	0400	vl	Guatemala, Radio Cultural	5955do	
0300	0400		Guyana, Voice of 3291do	5950do	
0300	0400		Japan, Radio 17825ca	21610pa	
0300	0400		Malaysia, Radio 7295do		
0300	0400		Malaysia, Voice of 6175as	9665as	9750as
			15295au		
0300	0400		Namibia, NBC 3270af	3290af	6090af
0300	0400		New Zealand, Radio NZ Intl	17675pa	
0300	0400		Oman, Radio 15355af		
0300	0400		Russia, University Network	17765as	
0300	0400		Russia, Voice of 9665na	11720na	11750na
			12000na 17565na 17650na	17660na	17690na
0300	0400		Sierra Leone, Radio UNAMSIL	6139af	
0300	0400		Singapore, SBC Radio One	6150do	
0300	0400	vl	Solomon Islands, SIBC 5020do	9545do	
0300	0400		Sri Lanka, SLBC 6005as	11905as	15745as
0300	0400		Taiwan, R Taipei Intl 5950na	9680na	15215sa
			15320as		
0300	0400		Turkey, Voice of 7270va	9650eu	11655va
0300	0400		Uganda, Radio 4976do	5026do	7196do
0300	0400		UK, BBC World Service	3255af	5975am
			6005af 6190af 6195eu	7120af	7160af
			9410eu 9750af 9825am	11760as	11835am
			12035af 12095eu 15280as	15310as	15360as
			15575me 17760as 17790as	21660as	21830as
0300	0400		UK, British Forces BCS 7260me	15795me	
0300	0400		Ukraine, R Ukraine Intl 12040na		
0300	0400		USA, Armed Forces Network	3903usb	4278usb
			4319usb 4993usb 6350usb	6458usb	10320usb
			12579usb 12689usb	13362usb	
0300	0400		USA, KAIJ Dallas TX 5755va		
0300	0400		USA, KTBN Salt Lk City UT	7505na	
0300	0400		USA, KWHR Naalehu HI	17510as	
0300	0400		USA, WBCQ Kennebunk, ME	7415na	9329na
0300	0400		USA, WBOH Newport NC	5920am	
0300	0400		USA, WEWN Birmingham AL	5825na	
0300	0400		USA, WHRA Greenbush ME	7580va	
0300	0400		USA, WHRI Noblesville IN	5745va	7315am
0300	0400		USA, WJIE Louisville KY	7490am	13595am
0300	0400	smtwhf	USA, WMLK Bethel PA 9465eu		
0300	0400		USA, WRMI Miami FL 7385na		
0300	0400		USA, WRNO New Orleans LA	7395am	
0300	0400		USA, WSHB Cypress Creek SC	7535am	9450eu
0300	0400		USA, WTJC Newport NC	9370na	
0300	0400		USA, WWCR Nashville TN	3210na	5070na
			5935na 7465na		
0300	0400		USA, WWRB Manchester TN	5050na	5085na
			6890na		
0300	0400		USA, WYFR Okeechobee FL	6065na	9505na
			11740sa		
0300	0400		Zambia, Christian Voice	4965do	
0305	0312		Croatia, Croatian Radio	9925na	
0310	0330		Vatican City, Vatican Radio	9660af	
0330	0340		Libya, Voice of Africa 15435af	21695af	
0330	0350		UAE, Radio Dubai 12005na	13675na	15400na
			17890na		
0330	0357		Czech Rep, Radio Prague Intl	11600va	15620va
0330	0357		Vietnam, Voice of 6175na		

0330	0400		Malaysia, RTM Kota Kinabalu		5979do	
0330	0400		UAE, AWR Africa	15160as		
0330	0400		UK, BBC World Service		15420af	
0330	0400		USA, Voice of America	6080af	7105af	7290af
			9575af 9885af	11835af	12080af	17895af
0345	0400		Tajikistan, Radio	7245as		

0400 UTC - 12AM E / 11PM C / 9PM P

0400	0415		Israel, Kol Israel	9435va	15640va	17600va
0400	0415		South Africa, TWR	11640af		
0400	0430		France Radio France Intl		9550af	11700af
			11910af 13610af			
0400	0430	vl	Guatemala, Radio Cultural		5955do	
0400	0430	s twhfa	Mexico, Radio Mexico Intl		9705am	11770am
0400	0430		South Africa, Channel Africa		5955af	
0400	0430		Sri Lanka, SLBC	6005as	11905as	15745as
0400	0430		UK, Project Airwaves	21510as		
0400	0456		China, China Radio Intl		9560na	9755na
0400	0456		Romania, R Romania Intl		9510na	11940na
			15335as 17735as			
0400	0500		Anguilla, Caribbean Beacon		6090am	
0400	0500		Australia, ABC NT Alice Springs		2310irr	4835do
0400	0500		Australia, ABC NT Katherine		5025do	
0400	0500		Australia, ABC NT Tennant Crk		4910do	
0400	0500		Australia, Radio	9660pa	12080va	15240pa
			15415as 15515va	17580pa	17750as	21725as
0400	0500	vl	Botswana, Radio	3356do	4820do	7255do
0400	0500		Canada, CBC Northern Service		9625do	
0400	0500		Canada, CFRX Toronto ON		6070do	
0400	0500		Canada, CKZN St John's NF		6160do	
0400	0500		Canada, CKZU Vancouver BC		6160do	
0400	0500		Costa Rica, R for Peace Intl		7445am	15038va
0400	0500		Costa Rica, University Network		5030am	6150am
			7375am 9725sa	11870am	13750na	17645as
0400	0500		Cuba, Radio Havana	6000na	9820na	11705usb
0400	0500	a	Finland, Scandinavian Weekend R		5980va	
0400	0500		Germany, Deutsche Welle		7225af	11945af
			15410af			
0400	0500		Guyana, Voice of	3291do	5950do	
0400	0500		Malaysia, Radio	7295do		
0400	0500		Malaysia, RTM Kota Kinabalu		5979do	
0400	0500		Malaysia, Voice of	6175as	9665as	9750as
			15295as			
0400	0500		Namibia, NBC	3270af	3290af	6090af
0400	0500		New Zealand, Radio NZ Intl		17675pa	
0400	0500		Russia, University Network		17765as	
0400	0500		Russia, Voice of	9665na	11720na	11750na
			12000na 17565na	17650na	17660na	17690na
0400	0500		Sierra Leone, Radio UNAMSIL		6139af	
0400	0500		Singapore, SBC Radio One		6150do	
0400	0500	vl	Solomon Islands, SIBC	5020do	9545do	
0400	0500		Uganda, Radio	4976do	5026do	7196do
0400	0500		UK, BBC World Service		3255af	5975va
			6005af 6190af	6195eu	7120af	7160af
			9410eu 11835am	11760as	12095eu	15280as
			15310as 15360as	15420af	15575me	17640af
			17760as 17790as	21660as	21830as	
0400	0500		UK, British Forces BCS	11975me	15795me	
0400	0500		USA, Armed Forces Network		3903usb	4278usb
			4319usb 4993usb	6350usb	6458usb	10320usb
			12579usb	12689usb	13362usb	
0400	0500		USA, KAIJ Dallas TX	5755va		
0400	0500		USA, KTBN Salt Lk City UT		7505na	
0400	0500		USA, KWHR Naalehu HI		17780as	
0400	0500		USA, Voice of America	4960af	6080af	7290af
			9530eu 9575af	9885af	11835af	11965eu
			12080af 15205eu	17895af		
0400	0500		USA, WBCQ Kennebunk, ME		7415na	
0400	0500	twhfa	USA, WBCQ Kennebunk, ME		9329na	
0400	0500		USA, WBOH Newport NC		5920am	
0400	0500		USA, WEWN Birmingham AL		5825na	
0400	0500		USA, WHRA Greenbush ME		7580va	
0400	0500		USA, WHRI Noblesville IN		5745va	7315am
0400	0500		USA, WJIE Louisville KY		7490am	13595am
0400	0500	smtwhf	USA, WMLK Bethel PA	9465eu		
0400	0500		USA, WRMI Miami FL	7385na		
0400	0500		USA, WRNO New Orleans LA		7395am	
0400	0500		USA, WSHB Cypress Creek SC		9450eu	13720af
0400	0500		USA, WTJC Newport NC		9370na	
0400	0500		USA, WWCR Nashville TN		3210na	5070na
			5935na 7560na			
0400	0500		USA, WWRB Manchester TN		5050na	5085na
			6890na			
0400	0500		USA, WYFR Okeechobee FL		6065na	7355eu
			9355eu 9505na	9715na	11580eu	
0400	0500		Zambia, Christian Voice		6065do	
0427	0500	smt a	Madagascar, Radio VO Hope		12060af	15320af
0430	0445		UK, BBC World Service		6010eu	9815eu
0430	0500		Netherlands, Radio	6165na	9590na	
0430	0500		Nigeria, Radio/Abuja	7275do		
0430	0500		Nigeria, Radio/Enugu	6025do		
0430	0500		Nigeria, Radio/Ibadan		6050do	
0430	0500		Nigeria, Radio/Kaduna		4770do	6090do
0430	0500		Nigeria, Radio/Lagos	3326do	4990do	
0430	0500		Serbia & Montenegro, R Yugo		9580va	
0430	0500		Swaziland, TWR	3200af	4775af	
0438	0450		Croatia, Croatian Radio		9925na	
0445	0500		Italy, RAI Intl	6110af	7235af	9875af

0500 UTC - 1AM E / 12AM C / 10PM P

0500	0505		New Zealand, Radio NZ Intl		17675pa	
0500	0520		Vatican City, Vatican Radio		4005eu	5890eu
			7250eu 9660af	11625af	15570af	
0500	0530		France Radio France Intl		11685af	15155af
			17800af			
0500	0530		Netherlands, Radio	6165na	9590na	
0500	0530		South Africa, AWR Africa		3215af	3345af
0500	0530		South Africa, Channel Africa		11710af	
0500	0530		UK, BBC World Service		15280as	
0500	0556		China, China Radio Intl		9560na	
0500	0600		Anguilla, Caribbean Beacon		6090am	
0500	0600		Australia, ABC NT Alice Springs		2310irr	4835do
0500	0600		Australia, ABC NT Katherine		5025do	
0500	0600		Australia, ABC NT Tennant Crk		4910do	
0500	0600		Australia, Radio	9660pa	12080va	15240pa
			15415as 15515va	17580pa	21725as	
0500	0600	mtwhf	Bhutan, Bhutan BC Service		5030al	6035do
0500	0600	vl	Botswana, Radio	3356do	4820do	7255do
0500	0600		Canada, CFRX Toronto ON		6070do	
0500	0600		Canada, CKZN St John's NF		6160do	
0500	0600		Canada, CKZU Vancouver BC		6160do	
0500	0600		Costa Rica, R for Peace Intl		7445am	15038va
0500	0600		Costa Rica, University Network		5030am	6150am
			7375am 9725sa	11870am	13750na	17645as
0500	0600		Cuba, Radio Havana	6195am	9665usb	9820na
0500	0600	a	Finland, Scandinavian Weekend R		5990va	11720va
0500	0600		Germany, Deutsche Welle		9700af	11925af
			12045af 13755af	15410af		
0500	0600		Guyana, Voice of	3291do	5950do	
0500	0600		Japan, Radio	5975eu	6110na	7230eu
			11715as 11760as	15195as	17810as	21755pa
0500	0600		Kuwait, Radio	15110as		
0500	0600		Malaysia, Radio	7295do		
0500	0600		Malaysia, RTM Kota Kinabalu		5979do	
0500	0600		Malaysia, Voice of	6175as	9665as	9750as
			15295as			
0500	0600		Namibia, NBC	6060af	6175af	
0500	0600		Nigeria, Radio/Abuja	7275do		
0500	0600		Nigeria, Radio/Enugu	6025do		
0500	0600		Nigeria, Radio/Ibadan		6050do	
0500	0600		Nigeria, Radio/Kaduna		4770do	6090do
0500	0600		Nigeria, Radio/Lagos	3326do	4990do	
0500	0600		Nigeria, Voice of	7255af	9690af	11770af
			15120af			
0500	0600		Russia, University Network		17765as	
0500	0600		Russia, Voice of	17635au	21790au	
0500	0600		Sierra Leone, Radio UNAMSIL		6139af	
0500	0600		Singapore, SBC Radio One		6150do	
0500	0600	vl	Solomon Islands, SIBC	5020do	9545do	
0500	0600		Swaziland, TWR	4775af	6120af	9500af
0500	0600		Uganda, Radio	4976do	5026do	7196do
0500	0600		UK, BBC World Service		6190af	6005af
			6195eu 7120af	7160af	9410eu	11760me
			11765af 11940af	11955as	15310as	15360as
			15420af 15565eu	15575as	17640af	17760as
			17790as 17885af	21660as		
0500	0600		UK, British Forces BCS	11975me	15795me	
0500	0600		USA, Armed Forces Network		3903usb	4278usb
			4319usb 4993usb	6350usb	6458usb	10320usb
			12579usb	12689usb	13362usb	
0500	0600		USA, KAIJ Dallas TX	5755va		
0500	0600		USA, KTBN Salt Lk City UT		7505na	
0500	0600		USA, KWHR Naalehu HI		17780as	
0500	0600		USA, Voice of America	6035af	6080af	7290af
			9530eu 11835af	11965eu	12080af	15205eu
0500	0600	mtwhf	USA, Voice of America	7195af		
0500	0600		USA, WBCQ Kennebunk, ME		7415na	
0500	0600		USA, WBCQ Kennebunk, ME		7415na	
0500	0600		USA, WBOH Newport NC		5920am	
0500	0600		USA, WEWN Birmingham AL		5825na	
0500	0600		USA, WHRA Greenbush ME		11730af	
0500	0600		USA, WHRI Noblesville IN		5745va	7315am
0500	0600		USA, WJIE Louisville KY		7490am	13595am
0500	0600	smtwhf	USA, WMLK Bethel PA	9465eu		
0500	0600		USA, WRMI Miami FL	7385na		
0500	0600		USA, WRNO New Orleans LA		7395am	
0500	0600		USA, WSHB Cypress Creek SC		9450eu	9840af
0500	0600		USA, WTJC Newport NC		9370na	
0500	0600		USA, WWCR Nashville TN		3210na	5070na
			5935na 7560na			
0500	0600		USA, WWRB Manchester TN		5050na	5085na
			6890na			
0500	0600		USA, WYFR Okeechobee FL		9355eu	
0500	0600		Zambia, Christian Voice		6065do	
0505	0512		Croatia, Croatian Radio		9470pa	
0506	0600		New Zealand, Radio NZ Intl		11820pa	
0515	0525		Rwanda, Radio	6005do		
0520	0530		Vatican City, Vatican Radio		9660af	11625af

			15570af			
0525	0600	vl	Ghana, Ghana BC Corp		3366do	4915do
0530	0545	as	UK, BBC World Service		9875eu	
0530	0550		UAE, Radio Dubai	13675au	15435au	17830au
			21700au			
0530	0600		Georgia, Georgian Radio		11805eu	
0530	0600	mtwhf/vl	Italy, IRRS	13840va		
0530	0600		South Africa, AWR Africa		15105af	
0530	0600		Thailand, Radio	21795eu		

0600 UTC - 2AM E / 1AM C / 11PM P

0600	0630		France Radio France Intl		11665af	17800af
			21620af			
0600	0630	mtwhf/vl	Italy, IRRS	13840va		
0600	0630		South Africa, Channel Africa		15215af	
0600	0630		Swaziland, TWR	4775af	6120af	9500af
0600	0630	mtwhf	USA, Voice of America	7195af	7290af	
0600	0630		USA, Voice of America	6035af	6080af	9530eu
			9760eu 11805eu	11835af	11965eu	11995af
			12080af 15205eu			
0600	0637		Romania, R Romania Intl		9530na	11830na
0600	0700		Anguilla, Caribbean Beacon		6090am	
0600	0700		Australia, ABC NT Alice Springs		2310irr	4835do
0600	0700		Australia, ABC NT Katherine		5025do	
0600	0700		Australia, ABC NT Tennant Crk		4910do	
0600	0700		Australia, Radio	9660pa	12080va	15240pa
			15415as 15515va	17580pa	21725as	
0600	0700	vl	Botswana, Radio	3356do	4820do	7255do
0600	0700		Canada, CFRX Toronto ON		6070do	
0600	0700		Canada, CFVP Calgary AB		6030do	
0600	0700		Canada, CKZN St John's NF		6160do	
0600	0700		Canada, CKZU Vancouver BC		6160do	
0600	0700		Costa Rica, R for Peace Intl		7445am	15038va
0600	0700		Costa Rica, University Network		5030am	6150am
			7375am 9725sa	11870am	13750na	17645as
0600	0700		Cuba, Radio Havana	6195am	9665usb	9820na
0600	0700	a	Finland, Scandinavian Weekend R		5990va	11690va
0600	0700		Germany, Deutsche Welle		6140eu	9780af
			15275af 17860af			
0600	0700	vl	Ghana, Ghana BC Corp		3366do	4915do
0600	0700		Guyana, Voice of	3291do	5950do	
0600	0700		Japan, Radio	7230eu	11740as	13630na
			13630na 15195as	17870pa	21755pa	
0600	0700		Kuwait, Radio	15110as		
0600	0700		Liberia, ELWA	4760do		
0600	0700		Liberia, R Liberia Intl	6100do		
0600	0700		Liberia, Radio Veritas	5470af		
0600	0700		Malaysia, Radio	7295do		
0600	0700		Malaysia, Voice of	6175as	9665as	9750as
			15295au			
0600	0700		Namibia, NBC	6060af	6175af	
0600	0700		New Zealand, Radio NZ Intl		11820pa	
0600	0700		Nigeria, Radio/Abuja	7275do		
0600	0700		Nigeria, Radio/Enugu	6025do		
0600	0700		Nigeria, Radio/Ibadan		6050do	
0600	0700		Nigeria, Radio/Kaduna		4770do	6090do
0600	0700		Nigeria, Radio/Lagos	3326do	4990do	
0600	0700		Nigeria, Voice of	7255af	9690af	11770af
			15120af			
0600	0700		Russia, University Network		17765as	
0600	0700		Russia, Voice of	15490au	17635au	21790au
0600	0700		Sierra Leone, Radio UNAMSIL		6139af	
0600	0700		Singapore, SBC Radio One		6150do	
0600	0700	vl	Solomon Islands, SIBC	5020do	9545do	
0600	0700		Uganda, Radio	4976do	5026do	7196do
0600	0700		UK, BBC World Service		6055af	6190af
			7120af 7160af	9410eu	11765af	11940af
			11955as 12095eu	15310as	15360as	15485eu
			15565eu 15575as	17640af	17760as	17790as
			21660as			
0600	0700	as	UK, BBC World Service		17885af	
0600	0700		UK, British Forces BCS	15425me	15795me	
0600	0700		USA, Armed Forces Network		3903usb	4278usb
			4319usb 4993usb	6350usb	6458usb	10320usb
			12579usb	12689usb	13362usb	
0600	0700		USA, KAIJ Dallas TX	5755va		
0600	0700		USA, KTBN Salt Lk City UT		7505na	
0600	0700		USA, KWHR Naalehu HI		17780as	
0600	0700		USA, WBCQ Kennebunk, ME		7415na	
0600	0700		USA, WBOH Newport NC		5920am	
0600	0700		USA, WEWN Birmingham AL		5825na	9385eu
0600	0700		USA, WHRA Greenbush ME		11730af	
0600	0700		USA, WHRI Noblesville IN		5745va	7315am
0600	0700		USA, WJIE Louisville KY		7490am	13595am
0600	0700	smtwhf	USA, WMLK Bethel PA	9465eu		
0600	0700		USA, WRMI Miami FL	7385na		
0600	0700		USA, WRNO New Orleans LA		7395am	
0600	0700		USA, WSHB Cypress Creek SC		9450af	
0600	0700		USA, WTJC Newport NC		9370na	
0600	0700		USA, WWCR Nashville TN		3210na	5070na
			5935na 7560na			
0600	0700		USA, WYFR Okeechobee FL		7355eu	11580eu
0600	0700	vl	Vanuatu, Radio	3945al	4960do	
0600	0700		Yemen, Rep of Yemen Radio		9780me	
0600	0700		Zambia, Christian Voice		9865do	
0630	0645	mtwhf	Vatican City, Vatican Radio		4005eu	5890eu
			6185eu 7250eu	9645eu	11740eu	15595eu
0630	0700		Bulgaria, Radio	11600eu	13600eu	
0630	0700		Swaziland, TWR	6120af	9500af	
0630	0700		UK, BBC World Service		15400af	
0630	0700		USA, Voice of America	9530eu	9760eu	11805eu
			11965eu 15205eu			
0630	0700	as	USA, Voice of America	6035af	6080af	7195af
			11835af 11995af	12080af		
0630	0700		Vatican City, Vatican Radio		11625af	15570af
0637	0700		Romania, R Romania Intl		9530na	9690eu
			11830na 11840eu	11940eu	15270eu	
0638	0650		Croatia, Croatian Radio		9470pa	
0645	0700	as	Germany, TWR	6045eu		
0645	0700	as	Monaco, TWR	9870eu		
0655	0700		Germany, TWR	6045eu		
0655	0700		Monaco, TWR	9870eu		

0700 UTC - 3AM E / 2AM C / 12AM P

0700	0705		New Zealand, Radio NZ Intl		11820pa	
0700	0727		Czech Rep, Radio Prague Intl		9880eu	11600eu
0700	0729		Belgium, Radio Vlaanderen Intl		5985eu	
0700	0730		Slovakia, R Slovakia Intl		9440au	15460au
			17550au			
0700	0745		Germany, Voice of Hope		5975eu	
0700	0750		Germany, TWR	6045eu		
0700	0750		Monaco, TWR	9870eu		
0700	0756		Romania, R Romania Intl		17720af	21480af
0700	0800		Anguilla, Caribbean Beacon		6090am	
0700	0800		Australia, ABC NT Alice Springs		2310irr	4835do
0700	0800		Australia, ABC NT Katherine		5025do	
0700	0800		Australia, ABC NT Tennant Crk		4910do	
0700	0800		Australia, Radio	9660pa	12080va	15240va
			15415as 17580pa	17750as	21725as	
0700	0800	vl	Botswana, Radio	3356do	4820do	7255do
0700	0800		Canada, CFRX Toronto ON		6070do	
0700	0800		Canada, CFVP Calgary AB		6030do	
0700	0800		Canada, CKZN St John's NF		6160do	
0700	0800		Canada, CKZU Vancouver BC		6160do	
0700	0800		Costa Rica, R for Peace Intl		7445am	15038va
0700	0800		Costa Rica, University Network		5030am	6150am
			7375am 9725sa	11870am	13750na	17645as
0700	0800		Ecuador, HCJB	11770pa		
0700	0800		Eqt Guinea, Radio Africa		15184af	
0700	0800	a	Finland, Scandinavian Weekend R		5990va	
0700	0800		France Radio France Intl		15605af	
0700	0800		Germany, Deutsche Welle		6140eu	
0700	0800	vl	Ghana, Ghana BC Corp		3366do	4915do
0700	0800		Guyana, Voice of	3291do	5950do	
0700	0800		Kuwait, Radio	15110as		
0700	0800		Liberia, ELWA	4760do		
0700	0800		Liberia, R Liberia Intl	6100do		
0700	0800		Liberia, Radio Veritas	5470af		
0700	0800		Malaysia, Radio	7295do		
0700	0800		Malaysia, RTM Kota Kinabalu		5979do	
0700	0800		Malaysia, Voice of	6175as	9665as	9750as
			15295au			
0700	0800		Myanmar, Radio	9730do		
0700	0800		Papua New Guinea, NBC		9675do	11880irr
0700	0800		Russia, University Network		17765as	
0700	0800		Russia, Voice of	15490au	17495au	17525au
			17635au			
0700	0800		Sierra Leone, Radio UNAMSIL		6139af	
0700	0800		Singapore, SBC Radio One		6150do	
0700	0800	vl	Solomon Islands, SIBC	5020do	9545do	
0700	0800		Taiwan, R Taipei Intl	5950na		
0700	0800	as	UK, BBC World Service		17885af	
0700	0800		UK, BBC World Service		6190af	7120af
			11760me 11765af	11940af	11955as	12095eu
			15310as 15360as	15400af	15485eu	15565eu
			15575eu 17640eu	17760as	17790as	21660as
0700	0800		USA, Armed Forces Network		3903usb	4278usb
			4319usb 4993usb	6350usb	6458usb	10320usb
			12579usb	12689usb	13362usb	
0700	0800		USA, KAIJ Dallas TX	5755va		
0700	0800		USA, KTBN Salt Lk City UT		7505na	
0700	0800		USA, KWHR Naalehu HI		11565pa	17780as
0700	0800		USA, Voice of America	13760as		
0700	0800		USA, WBCQ Kennebunk, ME		7415na	
0700	0800		USA, WBOH Newport NC		5920am	
0700	0800		USA, WEWN Birmingham AL		5825na	9385eu
0700	0800		USA, WHRA Greenbush ME		11730af	
0700	0800		USA, WHRI Noblesville IN		5745va	7315am
0700	0800		USA, WJIE Louisville KY		7490am	13595am
0700	0800	smtwhf	USA, WMLK Bethel PA	9465eu		
0700	0800		USA, WRMI Miami FL	7385na		
0700	0800		USA, WRNO New Orleans LA		7395am	
0700	0800		USA, WSHB Cypress Creek SC		9450af	
0700	0800		USA, WTJC Newport NC		9370na	
0700	0800		USA, WWCR Nashville TN		3210na	5070na
			5935na 7560na			
0700	0800		USA, WYFR Okeechobee FL		7355eu	11530af
			13695af			

0700	0800	vl	Vanuatu, Radio	3945al	4960do	
0705	0712		Croatia, Croatian Radio		13820au	
0706	0800		New Zealand, Radio NZ Intl		9885pa	
0725	0730	mtwhf	Guam, TWR/KTWR	15205as		
0730	0800		Austria, AWR Europe	9775eu		
0730	0800		Georgia, Georgian Radio		11910eu	
0730	0800		Guam, TWR/KTWR	15205as		
0730	0800		Switzerland, Swiss R Intl		13650va	15445va
			21750va			
0745	0800	mtwhf	Guam, TWR/KTWR	15330as		
0750	0800	smtwhf	Germany, TWR	6045eu		
0750	0800	smtwhf	Monaco, TWR	9870eu		

0800 UTC - 4AM E / 3AM C / 1AM P

0800	0804		Pakistan, Radio	17835eu	21465eu	
0800	0815		Guam, TWR/KTWR	15205as		
0800	0815	mtwhf	Guam, TWR/KTWR	15330as		
0800	0820	smtwhf	Germany, TWR	6045eu		
0800	0820	smtwhf	Monaco, TWR	9870eu		
0800	0825		Malaysia, Voice of	6175as	9665as	9750as
			15295au			
0800	0830		Australia, ABC NT Alice Springs		2310irr	4835do
0800	0830		Australia, ABC NT Katherine		5025do	
0800	0830		Australia, ABC NT Tennant Crk		4910do	
0800	0830		Malaysia, RTM Kota Kinabalu		5979do	
0800	0830		Myanmar, Radio	9730do		
0800	0900		Anguilla, Caribbean Beacon		6090am	
0800	0900		Australia, Radio	5995pa	9580va	9710pa
			11880as 12080va	15240va	15415as	15240va
			15415as 17750as	21725as		
0800	0900	mtwhf	Bhutan, Bhutan BC Service		5030al	6035do
0800	0900	vl	Botswana, Radio	3356do	4820do	7255do
0800	0900		Canada, CFRX Toronto ON		6070do	
0800	0900		Canada, CFVP Calgary AB		6030do	
0800	0900		Canada, CKZN St John's NF		6160do	
0800	0900		Canada, CKZU Vancouver BC		6160do	
0800	0900		Costa Rica, R for Peace Intl		7445am	15038va
0800	0900		Costa Rica, University Network		5030am	6150am
			7375am 9725sa	11870am	13750na	17645as
0800	0900		Ecuador, HCJB	11770pa		
0800	0900		Eqt Guinea, Radio Africa		15184af	
0800	0900	a	Finland, Scandinavian Weekend R		5990va	
0800	0900		Germany, Deutsche Welle		6140eu	
0800	0900	vl	Ghana Ghana BC Corp		3366do	4915do
0800	0900		Guyana, Voice of	3291do	5950do	
0800	0900		Indonesia, Voice of	9525va	11785as	
0800	0900	as/vl	Italy, IRRS 13840va			
0800	0900		Liberia, ELWA	4760do		
0800	0900		Liberia, R Liberia Intl	6100do		
0800	0900		Liberia, Radio Veritas	5470af		
0800	0900		Malaysia, Radio	7295do		
0800	0900	s	Malta, VO Mediterranean		9605eu	
0800	0900		New Zealand, Radio NZ Intl		9885pa	
0800	0900		Papua New Guinea, NBC		9675do	11880irr
0800	0900		Russia, University Network		17765as	
0800	0900		Sierra Leone, Radio UNAMSIL		6139af	
0800	0900		Singapore, SBC Radio One		6150do	
0800	0900	vl	Solomon Islands, SIBC	5020do	9545do	
0800	0900	a	South Africa, Radio League		9750af	21560af
0800	0900		South Korea, R Korea Intl		9570om	13670eu
0800	0900		Swaziland, TWR	6120af	9500af	
0800	0900		UK, BBC World Service		6190af	7120af
			11760me 11940af	11955as	12095eu	15310as
			15360as 15400af	15485eu	15565eu	17640eu
			17830af 17885as	21470af	21660as	21830as
0800	0900		USA, Armed Forces Network		3903usb	4278usb
			4319usb 4993usb	6350usb	6458usb	10320usb
			12579usb	12689usb	13362usb	
0800	0900		USA, KAIJ Dallas TX	5755va		
0800	0900		USA, KNLS Anchor Point AK		11765as	
0800	0900		USA, KTBN Salt Lk City UT		7505na	
0800	0900		USA, KWHR Naalehu HI		11565pa	17780as
0800	0900		USA, Voice of America	11930as	13620as	13760as
			15150as			
0800	0900		USA, WBCQ Kennebunk, ME		7415na	
0800	0900		USA, WBOH Newport NC		5920am	
0800	0900		USA, WEWN Birmingham AL		5825na	9385eu
0800	0900		USA, WHRI Noblesville IN		5745va	7315am
0800	0900		USA, WJIE Louisville KY		7490am	13595am
0800	0900	smtwhf	USA, WMLK Bethel PA	9465eu		
0800	0900		USA, WRMI Miami FL	7385na		
0800	0900		USA, WRNO New Orleans LA		7395am	
0800	0900		USA, WSHB Cypress Creek SC		9845au	9860eu
0800	0900		USA, WTJC Newport NC		9370na	
0800	0900		USA, WWCR Nashville TN		3210na	5070na
			5935na 7560na			
0800	0900		USA, WYFR Okeechobee FL		13570af	
0800	0900	vl	Vanuatu, Radio	3945al	4960do	
0810	0830	s	Armenia, Voice of	4810eu	15270as	
0815	0900		Guam, TWR/KTWR	15205as	15330as	
0830	0900		Australia, ABC NT Alice Springs		2310do	4835irr
0830	0900		Australia, ABC NT Katherine		2485do	
0830	0900		Australia, ABC NT Tennant Crk		2325do	
0830	0900		Austria, AWR Europe	17780af		
0830	0900		Georgia, Georgian Radio		11910me	
0830	0900		Lithuania, R Vilnius	9710eu		
0830	0900		Switzerland, Swiss R Intl		21770af	
0838	0850		Croatia, Croatian Radio		13820au	
0840	0850		Turkmenistan, Turkmen Radio		4930as	
0845	0900	as	Russia, Bible Voice BC	5975eu		

0900 UTC - 5AM E / 4AM C / 2AM P

0900	0915	as	Russia, Bible Voice BC	5975eu		
0900	0927		Czech Rep, Radio Prague Intl		21745va	
0900	0930		Austria, AWR Europe	17780af		
0900	0930		Guam, TWR/KTWR	15330as		
0900	0956		China, China Radio Intl		11730pa	15210pa
0900	1000		Anguilla, Caribbean Beacon		6090am	
0900	1000		Australia, ABC NT Alice Springs		2310do	4835irr
0900	1000		Australia, ABC NT Katherine		2485do	
0900	1000		Australia, ABC NT Tennant Crk		2325do	
0900	1000		Australia, Radio	9580va	11880as	15240as
			21820as			
0900	1000		Australia, Voice International		13685as	
0900	1000	vl	Botswana, Radio	3356do	4820do	7255do
0900	1000		Canada, CFRX Toronto ON		6070do	
0900	1000		Canada, CFVP Calgary AB		6030do	
0900	1000		Canada, CKZN St John's NF		6160do	
0900	1000		Canada, CKZU Vancouver BC		6160do	
0900	1000		Costa Rica, R for Peace Intl		7445am	15038va
0900	1000		Costa Rica, University Network		5030am	6150am
			7375am 9725sa	11870am	13750na	17645as
0900	1000		Eqt Guinea, Radio Africa		15184af	
0900	1000	a	Finland, Scandinavian Weekend R		5990va	
0900	1000		Germany, Deutsche Welle		6140eu	15440eu
0900	1000		Guyana, Voice of	3291do	5950do	
0900	1000	as/vl	Italy, IRRS 13840va			
0900	1000		Liberia, R Liberia Intl	6100do		
0900	1000		Liberia, Radio Veritas	5470af		
0900	1000		Malaysia, Radio	7295do		
0900	1000		New Zealand, Radio NZ Intl		9885pa	
0900	1000		Nigeria, Voice of	7255af	9690af	11770af
0900	1000		Palau, KHBN/VO Hope		15725as	
0900	1000		Papua New Guinea, NBC		4890do	9675irr
0900	1000		Russia, University Network		17765as	
0900	1000		Singapore, SBC Radio One		6150do	
0900	1000	vl	Solomon Islands, SIBC	5020do	9545do	
0900	1000	s	UAE, Radio UNMEE	21715af		
0900	1000		UK, BBC World Service		6190af	6195as
			7120af 9605as	9740as	11760me	11940af
			12095eu 15190sa	15310as	15360as	15400af
			15485eu 15565eu	15575as	17640eu	17760as
			17790as 17830af	17885af	21470af	21660as
0900	1000		USA, Armed Forces Network		3903usb	4278usb
			4319usb 4993usb	6350usb	6458usb	10320usb
			12579usb	12689usb	13362usb	
0900	1000		USA, KAIJ Dallas TX	5755va		
0900	1000		USA, KTBN Salt Lk City UT		7505na	
0900	1000		USA, KWHR Naalehu HI		11565pa	17780as
0900	1000		USA, Voice of America	11930as	13620as	13760as
			15150as			
0900	1000		USA, WBCQ Kennebunk, ME		7415na	
0900	1000		USA, WBOH Newport NC		5920am	
0900	1000		USA, WEWN Birmingham AL		5825na	
0900	1000		USA, WHRA Greenbush ME		11730af	
0900	1000		USA, WJIE Louisville KY		7490am	13595am
0900	1000		USA, WRMI Miami FL	9955am		
0900	1000		USA, WSHB Cypress Creek SC		9455sa	9860eu
0900	1000		USA, WTJC Newport NC		9370na	
0900	1000		USA, WWCR Nashville TN		5070na	5935na
			7560na 9475na			
0900	1000	vl	Vanuatu, Radio	3945al	4960do	
0900	1000	mt hfa	Vatican City, Vatican Radio		5890eu	
0930	1000		Greece, Voice of	12105eu	15630eu	17900eu
0930	1000		Netherlands, Radio	9785pa	12065as	13710as

1000 UTC - 6AM E / 5AM C / 3AM P

1000	1027		Vietnam, Voice of	9840au	12020au	
1000	1030		Germany, Deutsche Welle		17615as	17715as
1000	1030		Guam, AWR/KSDA	11560as	11930as	
1000	1030		Mongolia, Voice of	12085as		
1000	1030		Netherlands, Radio	9785pa	12065pa	13710as
1000	1030		UK, BBC World Service		9605as	21660as
1000	1030		UK, RTE Radio	15280au		
1000	1045		USA, KWHR Naalehu HI		9930as	11565pa
1000	1056		China, China Radio Intl		11730pa	15210pa
1000	1056		North Korea, Voice of	3560as	9335am	9849as
			11710am 11735as			
1000	1100		Anguilla, Caribbean Beacon		11775am	
1000	1100		Australia, ABC NT Alice Springs		2310do	4835irr
1000	1100		Australia, ABC NT Katherine		2485do	
1000	1100		Australia, ABC NT Tennant Crk		2325do	
1000	1100		Australia, Radio	9580va	11880as	15240as
			21820as			
1000	1100		Australia, Voice International		13685as	

1000	1100	as	Bhutan, Bhutan BC Service	5030al	6035do	
1000	1100		Canada, CFRX Toronto ON	6070do		
1000	1100		Canada, CFVP Calgary AB	6030do		
1000	1100		Canada, CKZN St John's NF	6160do		
1000	1100		Canada, CKZU Vancouver BC	6160do		
1000	1100		Costa Rica, R for Peace Intl	7445am	15038va	
1000	1100		Costa Rica, University Network	5030am	6150am	
			7375am 9725sa 11870am	13750na	17645as	
1000	1100		Eqt Guinea, Radio Africa	15184af		
1000	1100	a	Finland, Scandinavian Weekend R	5990va		
1000	1100		Germany, Deutsche Welle	6140eu	15440eu	
1000	1100		Guyana, Voice of 3291do	5949do		
1000	1100		India, All India Radio 13695as	15020as	15260as	
			15410as 17510au 17800as	17895au		
1000	1100	as/vl	Italy, IRRS 13840va			
1000	1100		Japan, Radio 9695as	15590as	17585eu	
			21755pa			
1000	1100		Liberia, R Liberia Intl 6100do			
1000	1100		Malaysia, Radio 7295do			
1000	1100		New Zealand, Radio NZ Intl	9885pa		
1000	1100		Palau, KHBN/VO Hope	15725as		
1000	1100		Papua New Guinea, NBC	4890do	9675irr	
1000	1100		Russia, University Network	17765as		
1000	1100		Singapore, SBC Radio One	6150do		
1000	1100	vl	Solomon Islands, SIBC 5020do	9545do		
1000	1100		South Africa, Radio Veritas	7240af		
1000	1100		UK, BBC World Service	6190af	6195va	
			7120af 9740as 11760me	11940af	12095eu	
			15310as 15360as 15485eu	15565eu	15575as	
			17640eu 17760as 17790as	17885af	21470af	
1000	1100	as	UK, BBC World Service	15400af	17830af	
1000	1100		USA, Armed Forces Network	3903usb	4278usb	
			4319usb 4993usb 6350usb	6458usb	10320usb	
			12579usb 12689usb	13362usb		
1000	1100		USA, KAIJ Dallas TX 5755va			
1000	1100		USA, KTBN Salt Lk City UT	7505na		
1000	1100		USA, Voice of America 5745am	7370am	9590am	
			9770as 13620as 15240as	15425as		
1000	1100		USA, WBOH Newport NC	5920am		
1000	1100		USA, WEWN Birmingham AL	7520na		
1000	1100		USA, WHRI Noblesville IN	9495am	9850na	
1000	1100		USA, WINB Red Lion PA	9320am		
1000	1100		USA, WJIE Louisville KY	7490am	13595am	
1000	1100		USA, WRMI Miami FL 9955am			
1000	1100		USA, WRNO New Orleans LA	7395am		
1000	1100		USA, WSHB Cypress Creek SC	6095am	9455sa	
			11780as			
1000	1100		USA, WTJC Newport NC	9370na		
1000	1100		USA, WWCR Nashville TN	5070na	5935na	
			7560na 15825na			
1000	1100		USA, WYFR Okeechobee FL	5950na		
1015	1030		Israel, Kol Israel 15640va	17525va	17545va	
1015	1030		UK, BBC World Service	11680eu	15325eu	
			17695eu			
1030	1045	mtwhf	Ethiopia, Radio 5990do	7110do	9704do	
1030	1057		Czech Rep, Radio Prague Intl	9880eu	11615eu	
1030	1100		Guam, AWR/KSDA 11560as			
1030	1100		Iran, VOIRI 15450as 15550as	15600as	21470as	
			21730as			
1030	1100		Netherlands, Radio 5965na	6045eu	9785au	
			9860eu 12065as 13710as			
1030	1100		UAE, Radio Dubai 13675eu	15395eu	17865eu	
			21605eu			
1030	1100	t	UAE, Radio UNMEE 21550af			
1030	1100		UK, BBC World Service	9605as	11945as	
			15285as 21660as			
1045	1100		USA, KWHR Naalehu HI	9930as		
1045	1100	as	USA, KWHR Naalehu HI	11565pa		

1100 UTC - 7AM E / 6AM C / 4AM P

1100	1104		Pakistan, Radio 17835eu	21465eu	
1100	1105		New Zealand, Radio NZ Intl	9885pa	
1100	1125		Netherlands, Radio 5965na	6045eu	9785au
			9860eu 12065as 13710as		
1100	1127		Vietnam, Voice of 11630as		
1100	1130	as	Bhutan, Bhutan BC Service	5030al	6035do
1100	1130		Iran, VOIRI 15450as 15550as	15600as	21470as
			21730as		
1100	1130	t	UAE, Radio UNMEE 21550af		
1100	1130		UK, BBC World Service	15400af	17790sa
1100	1130	mtwhf	UK, BBC World Service	6195ca	15190ca
1100	1200		Anguilla, Caribbean Beacon	11775am	
1100	1200		Australia, ABC NT Alice Springs	2310do	4835irr
1100	1200		Australia, ABC NT Katherine	2485do	
1100	1200		Australia, ABC NT Tennant Crk	2325do	
1100	1200		Australia, Radio 5995pa	6020pa	9475as
			9580va 11650va 11880as	12080va	21820as
1100	1200		Australia, Voice International	13685as	
1100	1200		Canada, CBC Northern Service	9625do	
1100	1200		Canada, CFRX Toronto ON	6070do	
1100	1200		Canada, CFVP Calgary AB	6030do	
1100	1200		Canada, CKZN St John's NF	6160do	
1100	1200		Canada, CKZU Vancouver BC	6160do	
1100	1200		Costa Rica, R for Peace Intl	7445am	15038va
1100	1200		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
1100	1200		Ecuador, HCJB 11770pa	12005am	15115am
			21455usb		
1100	1200	a	Finland, Scandinavian Weekend R	5990va	
1100	1200		Germany, Deutsche Welle	6140eu	15110as
			17820eu		
1100	1200	as/vl	Italy, IRRS 13840va		
1100	1200		Japan, Radio 6120na	9695as	15590as
1100	1200		Malaysia, Radio 7295do		
1100	1200		Papua New Guinea, NBC	4890do	9675irr
1100	1200		Russia, University Network	17765as	
1100	1200		Singapore, R Singapore Intl	6150as	9600as
1100	1200		Taiwan, R Taipei Intl 7445as	11985as	
1100	1200		UK, BBC World Service	6190af	6195va
			7120af 9740as 11760me	11940af	12095eu
			15190va 15310as 15485eu	15565eu	15575eu
			17640eu 17760as 17790as	17830af	17885af
			21470af		
1100	1200		Ukraine, R Ukraine Intl 15415eu		
1100	1200		USA, Armed Forces Network	3903usb	4278usb
			4319usb 4993usb 6350usb	6458usb	10320usb
			12579usb 12689usb	13362usb	
1100	1200		USA, KAIJ Dallas TX 5755va		
1100	1200		USA, KTBN Salt Lk City UT	7505na	
1100	1200	as	USA, KWHR Naalehu HI	11565pa	
1100	1200		USA, Voice of America 6160as	9645as	9760as
			9770as 13610as 15240as	15425as	
1100	1200		USA, WBOH Newport NC	5920am	
1100	1200		USA, WEWN Birmingham AL	7520na	
1100	1200		USA, WHRI Noblesville IN	9495am	9850na
1100	1200		USA, WINB Red Lion PA	9320am	
1100	1200		USA, WJIE Louisville KY	7490am	13595am
1100	1200		USA, WRMI Miami FL 9955am		
1100	1200		USA, WRNO New Orleans LA	7395am	
1100	1200		USA, WSHB Cypress Creek SC	6095am	9455am
1100	1200		USA, WTJC Newport NC	9370na	
1100	1200		USA, WWCR Nashville TN	5070na	5935na
			7560na 15825na		
1100	1200		USA, WYFR Okeechobee FL	5850na	5950na
			7335sa 11855sa		
1106	1200		New Zealand, Radio NZ Intl	9885pa	
1115	1145		Nepal, Radio 3230as	5005as	6100as
			7164as		
1125	1200		Netherlands, Radio 5965na	6045eu	9860eu
1130	1140		Libya, Voice of Africa 15435af	21695af	
1130	1145		UK, BBC World Service	7135as	11920as
1130	1159		Belgium, Radio Vlaanderen Intl	9865as	
1130	1200		Bulgaria, Radio 11700eu	15700eu	
1130	1200	s hfa	Russia, Bible Voice BC 13590as		
1130	1200		South Korea, R Korea Intl	9650na	
1130	1200		Sweden, Radio 17505va	17840na	
1130	1200	f	Vatican City, Vatican Radio	15595va	17515va

1200 UTC - 8AM E / 7AM C / 5AM P

1200	1225		Netherlands, Radio 5965na	6045eu	9860eu
1200	1230		Ecuador, HCJB 12005am	15115am	21455usb
1200	1230		France Radio France Intl	17815af	21620af
			25820af		
1200	1230		South Korea, R Korea Intl	9650na	
1200	1230		Uzbekistan, Radio Tashkent	7285as	9715as
			15295as 17775as		
1200	1256		China, China Radio Intl	9730as	9760pa
			11760pa 11980as 15415pa		
1200	1259		Poland, Radio Polonia	9525eu	11820eu
1200	1300		Anguilla, Caribbean Beacon	11775am	
1200	1300		Australia, ABC NT Alice Springs	2310do	4835irr
1200	1300		Australia, ABC NT Katherine	2485do	
1200	1300		Australia, ABC NT Tennant Crk	2325do	
1200	1300		Australia, Radio 5995pa	6020pa	9475as
			9580va 11650va 11880as	12080as	21820as
1200	1300		Australia, Voice International	13685as	
1200	1300		Canada, CBC Northern Service	9625do	
1200	1300		Canada, CFRX Toronto ON	6070do	
1200	1300		Canada, CFVP Calgary AB	6030do	
1200	1300		Canada, CKZN St John's NF	6160do	
1200	1300		Canada, CKZU Vancouver BC	6160do	
1200	1300		Canada, Radio Canada Intl	9660as	15190as
1200	1300	mtwhf	Canada, Radio Canada Intl	9515na	13655na
			17820na		
1200	1300		China, Voice of Hope 13590as		
1200	1300		Costa Rica, R for Peace Intl	7445am	15038va
1200	1300		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
1200	1300	a	Finland, Scandinavian Weekend R	5990va	11720va
1200	1300		Germany, Deutsche Welle	6140eu	15440eu
1200	1300	as/vl	Italy, IRRS 13840va		
1200	1300		Jordan, Radio 11690eu		
1200	1300		Malaysia, Radio 7295do		
1200	1300		New Zealand, Radio NZ Intl	9885pa	
1200	1300		Papua New Guinea, NBC	4890do	9675irr
1200	1300		Russia, University Network	17765as	

1200	1300		Singapore, R Singapore Intl	6150as	9600as
1200	1300		Taiwan, R Taipei Intl 7130as	9610au	
1200	1300		UK, BBC World Service	6190af	6195va
			7120af 9740as 11760me	11940af	12095eu
			15190as 15310as 15485eu	15565eu	15575me
			17640eu 17760as 17790as	17830af	17885af
			21470af		
1200	1300		USA, Armed Forces Network	3903usb	4278usb
			4319usb 4993usb 6350usb	6458usb	10320usb
			12579usb 12689usb	13362usb	
1200	1300		USA, KAIJ Dallas TX 5755va		
1200	1300		USA, KTBN Salt Lk City UT	7505na	
1200	1300		USA, KWHR Naalehu HI	9930as	
1200	1300	as	USA, KWHR Naalehu HI	11565pa	
1200	1300		USA, Voice of America 6160as	9645as	9760as
			13610as 15160as 15240as	15425as	
1200	1300	mtwhf	USA, WBCQ Kennebunk, ME	17494na	
1200	1300		USA, WBOH Newport NC	5920am	
1200	1300		USA, WEWN Birmingham AL	7520na	
1200	1300		USA, WHRI Noblesville IN	9495am	9850na
1200	1300		USA, WINB Red Lion PA	9320am	
1200	1300		USA, WJIE Louisville KY	7490am	13595am
1200	1300		USA, WRMI Miami FL 15725na		
1200	1300		USA, WRNO New Orleans LA	7395am	
1200	1300		USA, WSHB Cypress Creek SC	9430am	9880as
			11670am		
1200	1300		USA, WSHB Cypress Creek SC	9455am	9880as
			11670am		
1200	1300		USA, WTJC Newport NC	9370na	
1200	1300		USA, WWCR Nashville TN	7560na	12160na
			13845na 155825na		
1200	1300		USA, WYFR Okeechobee FL	5850na	5950na
			13695na 17750na		
1215	1300		Egypt, Radio Cairo 17775as		
1230	1245		UK, BBC World Service	15105af	17780af
			21640af		
1230	1257		Vietnam, Voice of 9840as	12019as	
1230	1300		Bangladesh, Bangla Betar	7185as	9550as
1230	1300		Ecuador, HCJB 12005am	15115am	15480as
			21455usb		
1230	1300		Sri Lanka, SLBC 6005as	11930as	15745as
1230	1300		Sweden, Radio 15750as	17505as	17840na
1230	1300		Thailand, Radio 9860as		
1230	1300		Turkey, Voice of 17595va	17830eu	
1230	1300		UAE, Gospel For Asia 15590as		
1230	1300	a	UK, Wales Radio Intl 17845au		

1300 UTC - 9AM E / 8AM C / 6AM P

1300	1305		New Zealand, Radio NZ Intl	9885pa	
1300	1310	mtwhfa	Turkmenistan, Turkmen Radio	5015as	
1300	1327		Czech Rep, Radio Prague Intl	13580eu	21745as
1300	1330		Egypt, Radio Cairo 17775as		
1300	1330		Turkey, Voice of 17595as	17830eu	
1300	1330		UAE, AWR Africa 17740as		
1300	1330		UAE, Gospel For Asia 15590as		
1300	1356		China, China Radio Intl	7405na	9570na
			11760pa 11900pa 11980as	15180as	17720na
1300	1356		North Korea, Voice of 4405as	7505eu	9335na
			11335eu 11710am		
1300	1400		Anguilla, Caribbean Beacon	11775am	
1300	1400		Australia, Radio 5995pa	6020pa	9580va
			11650va 11660as 21820as		
1300	1400		Australia, Voice International	13685as	
1300	1400		Canada, CBC Northern Service	9625do	
1300	1400		Canada, CFRX Toronto ON	6070do	
1300	1400		Canada, CFVP Calgary AB	6030do	
1300	1400		Canada, CKZN St John's NF	6160do	
1300	1400		Canada, CKZU Vancouver BC	6160do	
1300	1400		Canada, Radio Canada Intl	9515na	13655na
1300	1400	mtwhf	Canada, Radio Canada Intl	17820na	
1300	1400	as	Canada, Radio Canada Intl	17800na	
1300	1400		China, Voice of Hope 13590as		
1300	1400		Costa Rica, R for Peace Intl	7445am	15038va
1300	1400		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
1300	1400		Ecuador, HCJB 12005am	15115am	15480as
			21455usb		
1300	1400	a	Finland, Scandinavian Weekend R	5990va	11720va
1300	1400		Germany, Deutsche Welle	6140eu	
1300	1400		Germany, Overcomer Ministries	13810me	
1300	1400		Jordan, Radio 11690eu		
1300	1400		Malaysia, Radio 7295do		
1300	1400		Papua New Guinea, NBC	4890do	9675irr
1300	1400		Russia, University Network	17765as	
1300	1400		Singapore, R Singapore Intl	6150as	9600as
1300	1400	as	South Africa, Channel Africa	11780af	21620af
			21760af		
1300	1400		South Korea, R Korea Intl	9570om	13670om
1300	1400		Sri Lanka, SLBC 6005as	11930as	15745as
1300	1400		UK, BBC World Service	6190af	6195va
			7120af 9740as 11760me	11940af	12095eu
			15190va 15310as 15420af	15485eu	15575me
			17640eu 17760as 17790as	17830af	17885as
			21470af		
1300	1400		USA, Armed Forces Network	3903usb	4278usb
			4319usb 4993usb 6350usb	6458usb	10320usb
			12579usb 12689usb	13362usb	
1300	1400		USA, KAIJ Dallas TX 5755va		
1300	1400		USA, KJES Vado NM 11715na		
1300	1400		USA, KNLS Anchor Point AK	11870as	
1300	1400		USA, KTBN Salt Lk City UT	7505na	
1300	1400		USA, KWHR Naalehu HI	9930as	
1300	1400		USA, Voice of America 6160as	9645as	9760as
			15160as 15425as		
1300	1400		USA, WBCQ Kennebunk, ME	17494na	
1300	1400		USA, WBOH Newport NC	5920am	
1300	1400		USA, WEWN Birmingham AL	7520na	
1300	1400		USA, WHRA Greenbush ME	17560af	
1300	1400		USA, WHRI Noblesville IN	9850na	15105am
1300	1400		USA, WINB Red Lion PA	13570am	
1300	1400		USA, WJIE Louisville KY	7490am	13595am
1300	1400		USA, WRMI Miami FL 15725na		
1300	1400		USA, WRNO New Orleans LA	7395am	
1300	1400		USA, WSHB Cypress Creek SC	7460as	9430na
			11670na		
1300	1400		USA, WTJC Newport NC	9370na	
1300	1400		USA, WWCR Nashville TN	9475na	12160na
			13845na 15825na		
1300	1400		USA, WYFR Okeechobee FL	11560as	11830na
			11970na 17750na		
1306	1400	occasional	New Zealand, Radio NZ Intl	6095pa	
1330	1350		UAE, Radio Dubai 13630eu	13675eu	15395eu
			17865eu 21605eu		
1330	1357		Vietnam, Voice of 11630eu	13740eu	
1330	1400		Germany, Voice of Hope	15775as	
1330	1400		Guam, AWR/KSDA 11980as	15275as	
1330	1400		India, All India Radio 9690as	13710as	
1330	1400		Laos, Lao National Radio	7145do	
1330	1400		Serbia & Montenegro, R Yugo	11835au	
1330	1400		Sweden, Radio 17505va	17840na	
1330	1400		UAE, AWR Africa 15320as		
1330	1400		UK, BBC World Service	15105af	21640af
1330	1400		Uzbekistan, Radio Tashkent	7285as	9715as
			15295as 17775as		

1400 UTC - 10AM E / 9AM C / 7AM P

1400	1415	mtw	UK, BBC World Service	11860af	15420af
			21490af		
1400	1430		Ecuador, HCJB 12005am	15115am	15480as
			21455usb		
1400	1430		Mexico, Radio Mexico Intl	9705am	11770am
1400	1430		Thailand, Radio 9830as		
1400	1455	as	South Africa, Channel Africa	11780af	21620af
			21760af		
1400	1456		China, China Radio Intl	7405na	9700as
			11675as 11765as 13685af	15125af	17720na
1400	1456		Romania, R Romania Intl	15270eu	15365eu
			17790eu 17805eu		
1400	1500		Anguilla, Caribbean Beacon	11775am	
1400	1500		Australia, Radio 5995va	9475as	9580va
			11650va 11660as		
1400	1500		Australia, Voice International	13685as	
1400	1500		Canada, CBC Northern Service	9625do	
1400	1500		Canada, CFRX Toronto ON	6070do	
1400	1500		Canada, CFVP Calgary AB	6030do	
1400	1500		Canada, CKZN St John's NF	6160do	
1400	1500		Canada, CKZU Vancouver BC	6160do	
1400	1500		Canada, Radio Canada Intl	9515na	13655na
1400	1500	as	Canada, Radio Canada Intl	17800na	
1400	1500	mtwhf	Canada, Radio Canada Intl	17820na	
1400	1500		China, Voice of Hope 13590as		
1400	1500		Costa Rica, R for Peace Intl	7445am	15038va
1400	1500		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
1400	1500	a	Finland, Scandinavian Weekend R	5980va	11720va
1400	1500		France Radio France Intl	11610as	17515as
1400	1500		Germany, Deutsche Welle	6140eu	
1400	1500		Germany, Voice of Hope	15775as	
1400	1500		India, All India Radio 9690as	13710as	
1400	1500		Japan, Radio 7200as	9505na	11730as
			11840pa 11755me		
1400	1500		Jordan, Radio 11690eu		
1400	1500	occasional	New Zealand, Radio NZ Intl	6095pa	
1400	1500		Oman, Radio 15140eu		
1400	1500		Russia, University Network	17765as	
1400	1500		Russia, Voice of 7340as	9745as	12055as
			17645as		
1400	1500		Singapore, SBC Radio One	6150do	
1400	1500		Taiwan, R Taipei Intl 15265as		
1400	1500		UK, BBC World Service	6135as	6190af
			6195as 7120af 9740as	11940af	12095eu
			15190va 15310as 15485eu	15565eu	15575me
			17640eu 17790as 17830af	21470af	21660af
1400	1500		UK, British Forces BCS 13860me	17895me	
1400	1500		USA, Armed Forces Network	3903usb	4278usb
			4319usb 4993usb 6350usb	6458usb	10320usb

			12579usb	12689usb	13362usb	
1400	1500		USA, KAIJ Dallas TX	13815va		
1400	1500		USA, KJES Vado NM	11715na		
1400	1500		USA, KTBN Salt Lk City UT		7505na	
1400	1500		USA, KWHR Naalehu HI		9930as	
1400	1500		USA, Voice of America	6160as	7125as	9760as
			15160as 15255eu	15425as		
1400	1500		USA, WBCQ Kennebunk, ME		17494na	
1400	1500		USA, WBOH Newport NC		5920am	
1400	1500		USA, WEWN Birmingham AL		9955na	
1400	1500		USA, WHRA Greenbush ME		17560af	
1400	1500		USA, WHRI Noblesville IN		9850am	15105am
1400	1500		USA, WINB Red Lion PA		13570am	
1400	1500		USA, WJIE Louisville KY		7490am	13595am
1400	1500		USA, WRMI Miami FL	15725na		
1400	1500		USA, WRNO New Orleans LA		7395am	
1400	1500		USA, WTJC Newport NC		9370na	
1400	1500		USA, WWCR Nashville TN		9475na	12160na
			13845na 15825na			
1400	1500		USA, WYFR Okeechobee FL		11560as	11830na
			11970na 17750na			
1415	1420		Nepal, Radio	3230as	5005as	6100as
			7164as			
1430	1500		Ecuador, HCJB	15480as		
1430	1500		Myanmar, Radio	5040do	5985do	
1430	1500		Netherlands, Radio	9860as	11835as	12075as
			15220na			
1430	1500	a	Russia, Bible Voice BC	5945as		
1445	1500		Guam, TWR/KTWR	15330as		
1445	1500		UK, BBC World Service		6140as	7205as

1500 UTC - 11AM E / 10AM C / 8AM P

1500	1500	as	Canada, Radio Canada Intl		9515na	13655na
			17800na			
1500	1528	s	Hungary, Radio Budapest		6025eu	9715eu
1500	1530		Germany, Voice of Hope		15775as	
1500	1530	as	Germany, Voice of Hope		15680me	
1500	1530		Mexico, Radio Mexico Intl		9705am	11770am
1500	1530		Mongolia, Voice of	12015eu		
1500	1530		South Africa, Channel Africa		17770af	
1500	1545		Guam, TWR/KTWR	15330as		
1500	1556		China, China Radio Intl		7160as	9785as
			13685af 15125af			
1500	1556		North Korea, Voice of	4405as	7505eu	9335am
			11335eu 11710am			
1500	1600		Anguilla, Caribbean Beacon		11775am	
1500	1600		Australia, Radio	5995va	9475as	9580va
			11650va 11660as			
1500	1600		Australia, Voice International		13665as	
1500	1600		Canada, CBC Northern Service		9625do	
1500	1600		Canada, CFRX Toronto ON		6070do	
1500	1600		Canada, CFVP Calgary AB		6030do	
1500	1600		Canada, CKZN St John's NF		6160do	
1500	1600		Canada, CKZU Vancouver BC		6160do	
1500	1600		Canada, Radio Canada Intl		15455as	17720as
1500	1600		Costa Rica, R for Peace Intl		7445am	15038va
1500	1600		Costa Rica, University Network		5030am	6150am
			7375am 9725sa	11870am	13750na	17645as
1500	1600	a	Finland, Scandinavian Weekend R		5980va	11720va
1500	1600		Germany, Deutsche Welle		6140eu	
1500	1600	s	Ireland, Reflections Europe		3910eu	6295eu
			12255eu			
1500	1600		Japan, Radio	7200as	9750as	11705na
			11730as			
1500	1600		Jordan, Radio	11690na		
1500	1600	s	Latvia, Laser Radio	5935eu		
1500	1600		Myanmar, Radio	5040do	5985do	
1500	1600		Netherlands, Radio	9890as	11835as	12075as
			15220na			
1500	1600	occasional	New Zealand, Radio NZ Intl		6095pa	
1500	1600		Russia, University Network		17765as	
1500	1600		Russia, Voice of	4940me	4965me	4975me
			7315as 7325me	7340as	11500as	11985me
1500	1600		Singapore, SBC Radio One		6150do	
1500	1600		UK, BBC World Service		5975as	6135as
			6190af 6195as	7120af	9740as	11940af
			12095eu 15190va	15310as	15400af	15485eu
			15565eu 17790as	17830af	21470af	21660af
1500	1600		UK, British Forces BCS	13860me	17895me	
1500	1600		USA, Armed Forces Network		3903usb	4278usb
			4319usb 4993usb	6350usb	6458usb	10320usb
			12579usb	12689usb	13362usb	
1500	1600		USA, KAIJ Dallas TX	13815va		
1500	1600		USA, KTBN Salt Lk City UT		7505na	
1500	1600		USA, KWHR Naalehu HI		9930as	
1500	1600		USA, Voice of America	6160as	7125as	9590as
			9700eu 9760as	9845as	12040as	15205as
			15255eu 15550as			
1500	1600		USA, WBCQ Kennebunk, ME		17494na	
1500	1600		USA, WBOH Newport NC		5920am	
1500	1600		USA, WEWN Birmingham AL		9955na	
1500	1600		USA, WHRA Greenbush ME		17650af	
1500	1600		USA, WHRI Noblesville IN		13760va	15105am
1500	1600		USA, WINB Red Lion PA		13570am	
1500	1600		USA, WJIE Louisville KY		7490am	13595am
1500	1600	smtwhf	USA, WMLK Bethel PA	9465eu		
1500	1600		USA, WRMI Miami FL	15725na		
1500	1600		USA, WRNO New Orleans LA		7395am	15420al
1500	1600		USA, WTJC Newport NC		9370na	
1500	1600		USA, WWCR Nashville TN		9475na	12160na
			13845na 15825na			
1500	1600		USA, WYFR Okeechobee FL		6280as	11830na
			15520as 17750na			
1515	1530	mtw	Russia, Bible Voice BC	9540as	15680me	
1515	1600	a	Vatican City, Vatican Radio		13765as	15235as
1530	1545		Bangladesh, Bangla Betar		4882as	
1530	1545		UK, BBC World Service		11685as	15540as
1530	1600		Georgia, Georgian Radio		6180me	
1530	1600		Germany, Voice of Hope		15680me	17655me
1530	1600		Iran, VOIRI7245eu	9635as	11775as	
1530	1600	hfa	Russia, Bible Voice BC	17655as		
1540	1550		Turkmenistan, Turkmen Radio		4930do	
1545	1600	s h	Bangladesh, Bangla Betar		4882as	

1600 UTC - 12PM E / 11AM C / 9AM P

1600	1615		Pakistan, Radio	11570va	15065va	15725va
			17820va			
1600	1625		Netherlands, Radio	9890as	11835as	12075as
			15220na			
1600	1627		Czech Rep, Radio Prague Intl		5930eu	21745af
1600	1627		Vietnam, Voice of	11630eu	13740eu	
1600	1630		Germany, Voice of Hope		15680me	
1600	1630		Guam, AWR/KSDA	11560as	15215as	15235as
1600	1630		Iran, VOIRI7245eu	9635as	11775as	
1600	1630		Jordan, Radio	11690na		
1600	1630	w	Moldova, Radio Pridnestrovye		5960eu	
1600	1630		South Africa, Channel Africa		9525af	
1600	1630		Sri Lanka, SLBC	6005as	11930as	15745as
1600	1630		UAE, Gospel For Asia	11695as		
1600	1630		USA, KWHR Naalehu HI		9930as	
1600	1635		UAE, Radio Dubai	13630eu	13675eu	15395eu
			17865eu 21605eu			
1600	1650	occasional	New Zealand, Radio NZ Intl		6095pa	
1600	1656		North Korea, Voice of	3560as	9975af	11735af
1600	1700		Algeria, Radio Algiers Intl		11715eu	15160eu
1600	1700		Anguilla, Caribbean Beacon		11775am	
1600	1700		Australia, Radio	5995va	9475as	9580va
			11650va 11660as			
1600	1700		Australia, Voice International		13665as	
1600	1700		Canada, CBC Northern Service		9625do	
1600	1700		Canada, CFRX Toronto ON		6070do	
1600	1700		Canada, CFVP Calgary AB		6030do	
1600	1700		Canada, CKZN St John's NF		6160do	
1600	1700		Canada, CKZU Vancouver BC		6160do	
1600	1700		Costa Rica, R for Peace Intl		7445am	15038va
1600	1700		Costa Rica, University Network		5030am	6150am
			7375am 9725sa	11870am	13750na	17645as
1600	1700		Ecuador, HCJB	15480as		
1600	1700		Ethiopia, Radio	5990af	7110af	7165af
			9560af 9704af	11800af		
1600	1700	a	Finland, Scandinavian Weekend R		5980va	11720va
1600	1700		France Radio France Intl		9730af	11615af
			11995af 12015af	15255af	15605af	17605af
			17850af			
1600	1700		Germany, Deutsche Welle		6140eu	6170as
			7225as 17595as			
1600	1700	a	Greece, Voice of	9420eu	15630eu	17705na
1600	1700	s	Ireland, Reflections Europe		3910eu	6295eu
			12255eu			
1600	1700	s	Latvia, Laser Radio	5935eu		
1600	1700	mtwhf	Russia, Bible Voice BC	15680as	17655as	
1600	1700		Russia, Voice of	7315as	7350as	11720as
			11985me 12055as	15540me		
1600	1700		South Africa, Radio Veritas		3230af	
1600	1700		South Korea, R Korea Intl		5975om	9515af
			9870af			
1600	1700		Taiwan, R Taipei Intl	11550as		
1600	1700		UK, BBC World Service		3915as	5975as
			6190eu 6195as	7120af	7160as	9410eu
			9510as 11940af	12095eu	15190va	15310as
			15400af 15475eu	15565eu	17790as	17830af
			21470af			
1600	1700		UK, British Forces BCS	13860me	17635me	
1600	1700		USA, Armed Forces Network		3903usb	4278usb
			4319usb 4993usb	6350usb	6458usb	10320usb
			12579usb	12689usb	13362usb	
1600	1700		USA, KAIJ Dallas TX	13815va		
1600	1700		USA, KTBN Salt Lk City UT		15590na	
1600	1700		USA, Voice of America	12080af	13600as	17895af
1600	1700		USA, WBCQ Kennebunk, ME		17494na	
1600	1700		USA, WBOH Newport NC		5920am	
1600	1700		USA, WEWN Birmingham AL		13615na	
1600	1700		USA, WHRA Greenbush ME		17650af	
1600	1700		USA, WHRI Noblesville IN		13760va	15105am
1600	1700		USA, WINB Red Lion PA		13570am	
1600	1700		USA, WJIE Louisville KY		7490am	13595am

1600	1700	smtwhf	USA, WMLK Bethel PA 9465eu		
1600	1700		USA, WRMI Miami FL 15725na		
1600	1700		USA, WRNO New Orleans LA	7395am	15420al
1600	1700		USA, WSHB Cypress Creek SC	18910af	
1600	1700		USA, WTJC Newport NC	9370na	
1600	1700		USA, WWCR Nashville TN	9475na	12160na
			13845na 15825na		
1600	1700		USA, WWRB Manchester TN	9320na	12172na
1600	1700		USA, WYFR Okeechobee FL	11830na	15520as
			17750na 18980eu 21455eu	21525af	
1600	1700		Zimbabwe, SWR Africa 6145af		
1615	1630		UK, BBC World Service	15420af	
1615	1630		Vatican City, Vatican Radio	4005eu	5890eu
			7250eu 9645eu 15595eu		
1615	1700	as	UK, BBC World Service	21490af	
1630	1645		Israel, Kol Israel 15640va	17545va	
1630	1700		Egypt, Radio Cairo 15255af		
1630	1700		Guam, AWR/KSDA 11560as	11975as	15215as
			15235as		
1630	1700		Slovakia, R Slovakia Intl	5920eu	6055eu
			7345eu		
1630	1700		UAE, AWR Africa 17630me		
1630	1700		UK, BBC World Service	9530eu	11735eu
			13645eu 15420af		
1645	1700		Tajikistan, Radio 7245as		
1650	1700	mtwhf	New Zealand, Radio NZ Intl	6095pa	

1700 UTC - 1PM E / 12PM C / 10AM P

1700	1715	vl	Somalia, Radio Galkayo	6985va	
1700	1727		Czech Rep, Radio Prague Intl	5930eu	17485af
1700	1727		Vietnam, Voice of 9725eu		
1700	1730		Azerbaijan, Voice of 6110eu	9155eu	
1700	1730		Ecuador, HCJB 15185eu		
1700	1730		France Radio France Intl	15605af	17605af
1700	1730	twfa	Russia, Bible Voice BC 7430af	13810af	
1700	1730		South Africa, Channel Africa	15265af	
1700	1746		UK, BBC World Service	6005af	9630af
1700	1750	mtwhf	New Zealand, Radio NZ Intl	6095pa	
1700	1756		China, China Radio Intl	9570af	9695af
			11910af 11920af		
1700	1756		Romania, R Romania Intl	9510eu	11820eu
			11940eu 15380eu		
1700	1759		Poland, Radio Polonia	5995eu	7285eu
1700	1800		Anguilla, Caribbean Beacon	11775am	
1700	1800		Australia, Radio 5995va	9475as	9580va
			9815pa 11880va		
1700	1800		Australia, Voice International	11680as	
1700	1800		Canada, CBC Northern Service	9625do	
1700	1800		Canada, CFRX Toronto ON	6070do	
1700	1800		Canada, CFVP Calgary AB	6030do	
1700	1800		Canada, CKZN St John's NF	6160do	
1700	1800		Canada, CKZU Vancouver BC	6160do	
1700	1800		Costa Rica, R for Peace Intl	7445am	15038va
1700	1800		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
1700	1800		Egypt, Radio Cairo 15255af		
1700	1800		Eqt Guinea, Radio Africa	7189af	15184al
1700	1800	a	Finland, Scandinavian Weekend R	6170va	11690va
1700	1800		Germany, Deutsche Welle	6140eu	
1700	1800		Germnay, R Africa Intl 13820af	15715af	
1700	1800		Japan, Radio 9505na	11970eu	15355af
1700	1800		Russia, University Network	9940as	
1700	1800		Russia, Voice of 7315as	9775eu	9890eu
			11510af 11985af		
1700	1800	as	Russia, Voice of 9480eu		
1700	1800		Russia, Voice of Hope 9495eu		
1700	1800		South Africa, Radio Veritas	3230af	
1700	1800		Taiwan, R Taipei Intl 11550as		
1700	1800		UK, BBC World Service	3255af	3915as
			5975as 6190af 6195eu	7120af	7160as
			9410eu 9510as 12095eu	15310as	15400af
			15420af 15485eu 15565eu	17830af	21470af
1700	1800		UK, British Forces BCS 13860me	15150me	
1700	1800		USA, Armed Forces Network	3903usb	4278usb
			4319usb 4993usb 6350usb	6458usb	10320usb
			12579usb 12689usb	13362usb	
1700	1800		USA, KAIJ Dallas TX 13815va		
1700	1800		USA, KTBN Salt Lk City UT	15590na	
1700	1800		USA, WBCQ Kennebunk, ME	17494na	
1700	1800		USA, WBOH Newport NC	5920am	
1700	1800		USA, WEWN Birmingham AL	13615na	17595eu
1700	1800		USA, WHRA Greenbush ME	17650af	
1700	1800		USA, WHRI Noblesville IN	9495am	13760va
1700	1800		USA, WINB Red Lion PA	13570am	
1700	1800		USA, WJIE Louisville KY	7490am	13595am
1700	1800	smtwhf	USA, WMLK Bethel PA 9465eu		
1700	1800		USA, WRMI Miami FL 15725na		
1700	1800		USA, WRNO New Orleans LA	7395am	15420al
1700	1800		USA, WSHB Cypress Creek SC	18910af	
1700	1800		USA, WTJC Newport NC	9370na	
1700	1800		USA, WWCR Nashville TN	9475na	12160na
			13845na 15825na		
1700	1800		USA, WWRB Manchester TN	9320na	12172na
1700	1800		USA, WYFR Okeechobee FL	18980eu	21455eu
			21680af		
1700	1800		Zimbabwe, SWR Africa 6145af		
1715	1730		Swaziland, TWR 3200af		
1730	1740		Libya, Voice of Africa 15435af	21695af	
1730	1745		UK, BBC World Service	3390va	7230va
			9525va		
1730	1745	mw	UK, BBC World Service	6050eu	11955eu
			15585eu		
1730	1745	mtwhf	UK, United Nations Radio	7150af	15495me
			17810af		
1730	1759		Belgium, Radio Vlaanderen Intl	9925eu	13690eu
			13710me		
1730	1800		Bulgaria, Radio 9400eu	11900eu	
1730	1800		Georgia, Georgian Radio	11910eu	
1730	1800	s	Germany, Voice of Hope	15680me	
1730	1800		Guam, AWR/KSDA 9385me	12015me	
1730	1800		Liberia, ELWA 4760do		
1730	1800	mtwhffa	Malta, VO Mediterranean	9605eu	
1730	1800		Netherlands, Radio 6020af	7120af	11655af
1730	1800		Philippines, Radio Pilipinas	11720me	15190me
			17720me		
1730	1800		Swaziland, TWR 3200af	9500af	
1730	1800	mtwhfa	Sweden, Radio 6065va		
1730	1800	s	Sweden, Radio 13580va		
1730	1800		Switzerland, Swiss R Intl	13750va	15515va
			17870va		
1730	1800		Vatican City, Vatican Radio	13765af	15570af
			17515af		
1735	1745	vl/th	Paraguay, Radio Nacional	9739sa	
1745	1800		Bangladesh, Bangla Betar	7185eu	9550eu
			15520eu		
1745	1800		India, All India Radio 7410eu	9445af	9950eu
			11620eu 11935af 13605af	15075af	15155af
			17670af		
1751	1800		New Zealand, Radio NZ Intl	11725pa	

1800 UTC - 2PM E / 1PM C / 11AM P

1800	1827		Vietnam, Voice of 11630eu	13740eu	
1800	1830		Egypt, Radio Cairo 15255af		
1800	1830	s	Germnay, Universal Life	15750af	
1800	1830		Netherlands, Radio 6020af	7120af	11655af
1800	1830		South Africa, AWR Africa	3215af	3345af
			9520af		
1800	1830		South Africa, Channel Africa	15265af	
1800	1830		UK, BBC World Service	5975as	9510as
1800	1830		UK, RTE Radio 15585me		
1800	1845		Germany, Voice of Hope	5970eu	
1800	1850		New Zealand, Radio NZ Intl	11725pa	
1800	1900		Anguilla, Caribbean Beacon	11775am	
1800	1900	mtwhf	Argentina, RAE 9690eu	15345eu	
1800	1900		Australia, Radio 6080pa	7240va	9475as
			9580va 9815pa 11880va		
1800	1900		Australia, Voice International	11680as	
1800	1900		Bangladesh, Bangla Betar	7185eu	9550eu
			15520eu		
1800	1900		Canada, CBC Northern Service	9625do	
1800	1900		Canada, CFRX Toronto ON	6070do	
1800	1900		Canada, CFVP Calgary AB	6030do	
1800	1900		Canada, CKZN St John's NF	6160do	
1800	1900		Canada, CKZU Vancouver BC	6160do	
1800	1900		Costa Rica, R for Peace Intl	7445am	15038va
1800	1900		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
1800	1900		Eqt Guinea, Radio Africa	7189af	15184al
1800	1900	a	Finland, Scandinavian Weekend R	6170va	11690va
1800	1900		Germany, Deutsche Welle	6140eu	
1800	1900		Germnay, R Africa Intl 13820va	15715va	
1800	1900	s	Greece, Voice of 9420eu	15630eu	17705na
1800	1900		India, All India Radio 7410eu	9445af	9950eu
			11620eu 11935af 13605af	15075af	15155af
			17670af		
1800	1900	s	Ireland, Reflections Europe	3910eu	6295eu
			12255eu		
1800	1900		Kuwait, Radio 11990va		
1800	1900	s	Latvia, Laser Radio 5935eu		
1800	1900		Liberia, ELWA 4760do		
1800	1900		Liberia, R Liberia Intl 5100do		
1800	1900		Liberia, Radio Veritas 5470af		
1800	1900		Philippines, Radio Pilipinas	11720me	15190me
			17720me		
1800	1900		Russia, Bible Voice BC 5970eu	7430me	
1800	1900		Russia, University Network	9940as	
1800	1900		Russia, Voice of 9480eu	9775eu	9890eu
			11510af 11630eu 11675eu	11870af	
1800	1900		Sierra Leone, Radio UNAMSIL	6139af	
1800	1900	s	South Africa, Radio League	3215af	
1800	1900	as	South Africa, Radio Lusofonia	3345af	
1800	1900		South Africa, Radio Veritas	3230af	
1800	1900		Swaziland, TWR 3200af	9500af	
1800	1900		UK, BBC World Service	3255af	6190af
			6195eu 7120af 9410eu	12095eu	15310me
			15400af 15420af 17830af	21470af	

1800	1900		UK, British Forces BCS 6015me	13760me	
1800	1900		USA, Armed Forces Network 4319usb 4993usb 6350usb 12579usb 12689usb	3903usb 6458usb 13362usb	4278usb 10320usb
1800	1900		USA, KAIJ Dallas TX 13815va		
1800	1900		USA, KJES Vado NM 15385na		
1800	1900		USA, KTBN Salt Lk City UT	15590na	
1800	1900		USA, WBCQ Kennebunk, ME	17494na	
1800	1900	s	USA, WBCQ Kennebunk, ME	7415na	
1800	1900		USA, WBOH Newport NC	5920am	
1800	1900		USA, WEWN Birmingham AL	13615na	17595eu
1800	1900		USA, WHRA Greenbush ME	17650af	
1800	1900		USA, WHRI Noblesville IN	9495am	13760va
1800	1900		USA, WINB Red Lion PA	13570am	
1800	1900		USA, WJIE Louisville KY	7490am	13595am
1800	1900	smtwhf	USA, WMLK Bethel PA 9465eu		
1800	1900		USA, WRMI Miami FL 15725na		
1800	1900		USA, WRNO New Orleans LA	7395am	15420al
1800	1900		USA, WSHB Cypress Creek SC	15665eu	18910af
1800	1900		USA, WTJC Newport NC	9370na	
1800	1900		USA, WWCR Nashville TN 13845na 15825na	9475na	12160na
1800	1900		USA, WWRB Manchester TN	9320na	12172na
1800	1900		USA, WYFR Okeechobee FL	18980eu	
1800	1900		Yemen, Rep of Yemen Radio	9780me	
1800	1900		Zimbabwe, SWR Africa 6145af		
1830	1900		Georgia, Georgian Radio	11760eu	
1830	1900		Greece, Voice of 12105eu		
1830	1900		Netherlands, Radio 6020af 11655af 13700af 17605af	7120af 21590af	9895af
1830	1900		Serbia & Montenegro, R Yugo	6100eu	
1830	1900		Slovakia, R Slovakia Intl 7345eu	5920eu	6055eu
1830	1900		South Africa, AWR Africa	9520af	
1830	1900		Turkey, Voice of 9785eu		
1830	1900		UK, BBC World Service	6005af	9630af
1830	1900		UK, RTE Radio 13640na	21630af	
1845	1900		Albania, Radio Tirana Intl	7210eu	9520eu
1845	1900		Congo, RTVC 4765af	5985af	
1851	1900		New Zealand, Radio NZ Intl	15160pa	

1900 UTC - 3PM E / 2PM C / 12PM P

1900	1925		Israel, Kol Israel 11605va 17545va	15615va	15640af
1900	1927		Vietnam, Voice of 9725eu	11630eu	13740eu
1900	1928		Hungary, Radio Budapest 11720eu	3975eu	6025eu
1900	1930	s	Germany, Universal Life	15565me	
1900	1930	mtwhf	Nigeria, Radio Jakada Intl	15170af	
1900	1930		Philippines, Radio Pilipinas 17720me	11720me	15190me
1900	1930		Turkey, Voice of 9785eu		
1900	1945		India, All India Radio 7410eu 11620eu 11935af 13605af 17670af	9445af 15075af	9950eu 15155af
1900	1945		Iraq, Radio Iraq Intl 6175irr	9687irr	11787irr
1900	1956		China, China Radio Intl	9440af	13790af
1900	1956		North Korea, Voice of 4405as	7505eu	11335eu
1900	2000		Anguilla, Caribbean Beacon	11775am	
1900	2000		Australia, Radio 6080pa 9580va 9815pa 11880va	7240va	9500as
1900	2000		Australia, Voice International	11680as	
1900	2000	vl	Botswana, Radio 3356do	4820do	7255do
1900	2000		Canada, CBC Northern Service	9625do	
1900	2000		Canada, CFRX Toronto ON	6070do	
1900	2000		Canada, CFVP Calgary AB	6030do	
1900	2000		Canada, CKZN St John's NF	6160do	
1900	2000		Canada, CKZU Vancouver BC	6160do	
1900	2000		Costa Rica, R for Peace Intl	7445am	15038va
1900	2000		Costa Rica, University Network 7375am 9725sa 11870am	5030am 13750na	6150am 17645as
1900	2000		Eqt Guinea, Radio Africa	7189af	15184al
1900	2000	a	Finland, Scandinavian Weekend R	6170va	11690va
1900	2000		Germany, Deutsche Welle 11965af 13590af	6180af	7225af
1900	2000		Germany, Overcomer Ministries	3965eu	
1900	2000	vl	Ghana, Ghana BC Corp	3366do	4915do
1900	2000	as/vl	Italy, IRRS 5780va 6290al		
1900	2000		Kuwait, Radio 11990va		
1900	2000	s	Latvia, Laser Radio 5935eu		
1900	2000		Liberia, ELWA 4760do		
1900	2000		Liberia, R Liberia Intl 5100do		
1900	2000		Liberia, Radio Veritas 5470af		
1900	2000		Malaysia, Radio 7295do		
1900	2000	smtwh a	Malta, VO Mediterranean	12060eu	
1900	2000		Namibia, NBC 3270af	3290af	6060af
1900	2000		Netherlands, Radio 6020af 11655af 13700af 17605af	7120af 21590af	9895af
1900	2000		New Zealand, Radio NZ Intl	15160pa	
1900	2000		Nigeria, Radio/Abuja 7275do		
1900	2000		Nigeria, Radio/Enugu 6025do		
1900	2000		Nigeria, Radio/Ibadan	6050do	
1900	2000		Nigeria, Radio/Kaduna	4770do	6090do
1900	2000		Nigeria, Radio/Lagos 3326do	4990do	
1900	2000		Nigeria, Voice of 7255af 15120af	9690af	11770af
1900	2000	fa	Russia, Bible Voice BC 13710me		
1900	2000	s	Russia, Bible Voice BC 7430me	13725af	
1900	2000		Russia, University Network	9940as	
1900	2000		Russia, Voice of 7440eu 11675eu 12070eu 15735am	9775eu	9890eu
1900	2000		Sierra Leone, Radio UNAMSIL	6139af	
1900	2000		Sierra Leone, SLBS 3316do		
1900	2000	vl	Solomon Islands, SIBC 5020do	9545do	
1900	2000		South Korea, R Korea Intl	5975om	7275eu
1900	2000	a	Sri Lanka, SLBC 6010eu		
1900	2000		Swaziland, TWR 3200af		
1900	2000		Thailand, Radio 7155eu		
1900	2000		Uganda, Radio 4976do	5026do	7196do
1900	2000		UK, BBC World Service 6190af 6195eu 7120af 12095af 15310me 15400af	3255af 9410eu 17830af	6005af 9630af
1900	2000		UK, British Forces BCS 6015me	13760me	
1900	2000		UK, Christain Radio Africa	15590af	
1900	2000		USA, Armed Forces Network 4319usb 4993usb 6350usb 12579usb 12689usb	3903usb 6458usb 13362usb	4278usb 10320usb
1900	2000		USA, KAIJ Dallas TX 13815va		
1900	2000		USA, KTBN Salt Lk City UT	15590na	
1900	2000		USA, Voice of America 7260me 13635me	9680me	11925as
1900	2000		USA, WBCQ Kennebunk, ME	17494na	
1900	2000	s	USA, WBCQ Kennebunk, ME	7415na	
1900	2000		USA, WBOH Newport NC	5920am	
1900	2000		USA, WEWN Birmingham AL	13615na	17595eu
1900	2000		USA, WHRA Greenbush ME	17650af	
1900	2000		USA, WHRI Noblesville IN	9495am	13760va
1900	2000		USA, WINB Red Lion PA	13570am	
1900	2000		USA, WJIE Louisville KY	7490am	13595am
1900	2000	smtwhf	USA, WMLK Bethel PA 9465eu		
1900	2000		USA, WRMI Miami FL 15725na		
1900	2000		USA, WRNO New Orleans LA	7395am	15420al
1900	2000		USA, WSHB Cypress Creek SC	15665eu	18910af
1900	2000		USA, WTJC Newport NC	9370na	
1900	2000		USA, WWCR Nashville TN 13845na 15825na	9475na	12160na
1900	2000		USA, WWRB Manchester TN	9320na	12172na
1900	2000		USA, WYFR Okeechobee FL 18980eu	3230af	17750eu
1900	2000	vl	Vanuatu, Radio 3945al	7260do	
1900	2000		Zambia, Christian Voice	4965do	
1915	1925		Rwanda, Radio 6005do		
1915	1930		UK, BBC World Service	17885af	
1930	1959		Belgium, Radio Vlaanderen Intl	9925eu	13690eu
1930	2000	t h	Belarus, Radio Belarus Intl	7105eu	7210eu
1930	2000		Iran, VOIRI9800eu 11670eu	11750eu	11860eu
1930	2000		Papua New Guinea, NBC	4890do	9675irr
1930	2000		Slovakia, AWR Europe 7130eu		
1930	2000		Sweden, Radio 6065va		
1930	2000		Switzerland, Swiss R Intl 13795va 15220af	11815va	13645va
1930	2000		UK, Salamaa Radio 13855af		
1935	1955		Italy, RAI Intl 5970eu	9745eu	
1940	1945		Turkmenistan, Turkmen Radio	4930as	
1940	2000	mtwhfa	Armenia, Voice of 4810eu	9960eu	
1950	2000		Vatican City, Vatican Radio 7350eu	4005eu	5890eu

2000 UTC - 4PM E / 3PM C / 1PM P

2000	2010		Vatican City, Vatican Radio 7250eu 9660af 11625af	4005eu 13765af	5890eu
2000	2025		Netherlands, Radio 6020af 11655af 13700af 17605af	7120af 21590af	9895af
2000	2027		Czech Rep, Radio Prague Intl	5930eu	11600as
2000	2030		Iran, VOIRI9800eu 11670eu	11750eu	11860eu
2000	2030	as/vl	Italy, IRRS 5780va 6290al		
2000	2030		Mongolia, Voice of 12015eu		
2000	2030	as	Russia, Bible Voice BC 13725af		
2000	2030		Swaziland, TWR 3200af		
2000	2056		China, China Radio Intl 13630af 15110eu 17790eu	9440af	11640af
2000	2059	mtwhf	Spain, R Exterior Espana	9570af	15290eu
2000	2100		Algeria, Radio Algiers Intl	11715eu	15160eu
2000	2100		Anguilla, Caribbean Beacon	11775am	
2000	2100		Australia, Radio 9500as 11880va 12080va	9580va	9815pa
2000	2100		Australia, Voice International	11680as	
2000	2100	vl	Botswana, Radio 3356do	4820do	7255do
2000	2100		Canada, CBC Northern Service	9625do	
2000	2100		Canada, CFRX Toronto ON	6070do	
2000	2100		Canada, CFVP Calgary AB	6030do	
2000	2100		Canada, CKZN St John's NF	6160do	
2000	2100		Canada, CKZU Vancouver BC	6160do	
2000	2100		Canada, Radio Canada Intl 11690va 11965va 12015va 17870va	5850va 15325va	5995va 15470va

2000	2100		Costa Rica, R for Peace Intl	7445am	15038va
2000	2100		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
2000	2100		Ecuador, HCJB 15185eu		
2000	2100		Eqt Guinea, Radio Africa	7189af	15184al
2000	2100	a	Finland, Scandinavian Weekend R	6170va	11690va
2000	2100		Germany, Deutsche Welle	9780af	15205af
			17810af		
2000	2100		Germany, Overcomer Ministries	3965eu	
2000	2100	vl	Ghana, Ghana BC Corp	3366do	4915do
2000	2100		Guam, AWR/KSDA 11750as	11980as	
2000	2100		Indonesia, Voice of 11785eu	15150eu	
2000	2100	s	Ireland, Reflections Europe	3910eu	6295eu
			12255eu		
2000	2100		Kuwait, Radio 11990va		
2000	2100	s	Latvia, Laser Radio 5935eu		
2000	2100		Liberia, ELWA 4760do		
2000	2100		Liberia, R Liberia Intl 5100do		
2000	2100		Liberia, Radio Veritas 5470af		
2000	2100		Libya, Voice of Africa 11635af	15205af	
2000	2100		Malaysia, Radio 7295do		
2000	2100		Namibia, NBC 3270af	3290af	6060af
2000	2100		New Zealand, Radio NZ Intl	15160pa	
2000	2100		Nigeria, Radio/Abuja 7275do		
2000	2100		Nigeria, Radio/Enugu 6025do		
2000	2100		Nigeria, Radio/Ibadan	6050do	
2000	2100		Nigeria, Radio/Kaduna	4770do	6090do
2000	2100		Nigeria, Radio/Lagos 3326do	4990do	
2000	2100		Nigeria, Voice of 7255af	9690af	11770af
			15120af		
2000	2100		Papua New Guinea, NBC	4890do	9675irr
2000	2100		Russia, University Network	9940as	
2000	2100		Russia, Voice of 9775eu	11675eu	12070eu
			15455eu 15735am		
2000	2100		Sierra Leone, Radio UNAMSIL	6139af	
2000	2100		Sierra Leone, SLBS 3316do		
2000	2100	vl	Solomon Islands, SIBC 5020do	9545do	
2000	2100		Syria, Radio Damascus	12085eu	13610eu
2000	2100		Uganda, Radio 4976do	5026do	7196do
2000	2100		UK, AWR Europe 15385af		
2000	2100		UK, BBC World Service	3255af	6005af
			6190af 6195eu 7120af	9410eu	9630af
			12095af 15400af 17830af		
2000	2100		USA, Armed Forces Network	3903usb	4278usb
			4319usb 4993usb 6350usb	6458usb	10320usb
			12579usb 12689usb	13362usb	
2000	2100		USA, KAIJ Dallas TX 13815va		
2000	2100		USA, KTBN Salt Lk City UT	15590na	
2000	2100		USA, Voice of America 4950af	6095eu	9760eu
			9770eu 9850af 11855af	11975af	13670af
			15410af 15445af 15580af	17745af	17895af
2000	2100		USA, WBCQ Kennebunk, ME	7415na	9329na
			17494na		
2000	2100		USA, WBOH Newport NC	5920am	
2000	2100		USA, WEWN Birmingham AL	13615na	17595eu
2000	2100		USA, WHRA Greenbush ME	17650as	
2000	2100		USA, WHRI Noblesville IN	5745va	9495am
2000	2100		USA, WINB Red Lion PA	13570am	
2000	2100		USA, WJIE Louisville KY	7490am	13595am
2000	2100		USA, WRMI Miami FL 15725na		
2000	2100		USA, WRNO New Orleans LA	7395am	15420al
2000	2100		USA, WTJC Newport NC	9370na	
2000	2100		USA, WWCR Nashville TN	9475na	12160na
			13845na 15825na		
2000	2100		USA, WWRB Manchester TN	9320na	12172na
2000	2100		USA, WYFR Okeechobee FL	3230af	15195af
			17725sa 17845af 18930eu	18980eu	
2000	2100	vl	Vanuatu, Radio 3945al	7260do	
2000	2100		Zambia, Christian Voice	4965do	
2000	2100		USA, WSHB Cypress Creek SC	15665af	18910af
2010	2030		Vatican City, Vatican Radio	9660af	11625af
			13765af		
2025	2045		Italy, RAI Intl 6185va	9670va	11880af
2030	2040		Libya, Voice of Africa 15435af	21695af	
2030	2045		Swaziland, TWR 3200af		
2030	2045		Thailand, Radio 9680eu		
2030	2057		Vietnam, Voice of 11630eu	13740eu	
2030	2100	t h	Belarus, Radio Belarus Intl	7105eu	7210eu
2030	2100		Cuba, Radio Havana 11670eu	13660usb	
2030	2100		Egypt, Radio Cairo 15375af		
2030	2100		Turkey, Voice of 9525as		
2030	2100	f	UK, Wales Radio Intl 7325eu		
2030	2100	as	USA, Voice of America 4950af		
2030	2100		Uzbekistan, Radio Tashkent	5025eu	9545eu
			11905eu		
2045	2100		India, All India Radio 7410eu	9445eu	9575au
			9910au 9950eu 11620va	11715au	

2100 UTC - 5PM E / 4PM C / 2PM P

2100	2128		Hungary, Radio Budapest	6025eu	11890af
2100	2130		Canada, Radio Canada Intl	5850va	7235va
			13690va 15325va 17870va		
2100	2130		China, China Radio Intl	11640af	13630af
			15110eu 17790eu		
2100	2130		Cuba, Radio Havana 11670eu	13660usb	
2100	2130		Serbia & Montenegro, R Yugo	6100eu	
2100	2130		South Korea, R Korea Intl	3955eu	
2100	2130		Turkey, Voice of 9525as		
2100	2156		North Korea, Voice of 4405as	7505eu	11335eu
2100	2156		Romania, R Romania Intl	7185eu	9510eu
			9725eu 11775eu		
2100	2159	as	Spain, R Exterior Espana	9570af	9840eu
2100	2200		Anguilla, Caribbean Beacon	11775am	
2100	2200		Australia, Radio 7240va	9500as	9580va
			9660pa 11880va 12080va	17715va	21740va
2100	2200		Austria, AWR Europe 15130af		
2100	2200	vl	Botswana, Radio 3356do	4820do	7255do
2100	2200		Bulgaria, Radio 5800eu	7500eu	
2100	2200		Canada, CBC Northern Service	9625do	
2100	2200		Canada, CFRX Toronto ON	6070do	
2100	2200		Canada, CFVP Calgary AB	6030do	
2100	2200		Canada, CKZN St John's NF	6160do	
2100	2200		Canada, CKZU Vancouver BC	6160do	
2100	2200		Costa Rica, R for Peace Intl	7445am	15038va
2100	2200		Costa Rica, University Network	5030am	6150am
			7375am 9725sa 11870am	13750na	17645as
2100	2200		Ecuador, HCJB 15185eu		
2100	2200		Egypt, Radio Cairo 15375af		
2100	2200		Eqt Guinea, Radio Africa	7189af	15184al
2100	2200	f	Finland, Scandinavian Weekend R	6170va	11720va
2100	2200		Germany, Deutsche Welle	9440af	11865af
			15205af		
2100	2200	vl	Ghana, Ghana BC Corp	3366do	4915do
2100	2200		Guyana, Voice of 5949do		
2100	2200		India, All India Radio 7410eu	9445eu	9575au
			9910au 9950eu 11620va	11715au	
2100	2200	s	Ireland, Reflections Europe	3910eu	6295eu
			12255eu		
2100	2200		Japan, Radio 6035pa	6055eu	6180eu
			11855af 17825na 21670pa		
2100	2200		Liberia, ELWA 4760do		
2100	2200		Liberia, R Liberia Intl 5100do		
2100	2200		Liberia, Radio Veritas 5470af		
2100	2200		Malaysia, Radio 7295do		
2100	2200		Mexico, Radio Mexico Intl	9705am	11770am
2100	2200		Namibia, NBC 3270af	3290af	6060af
2100	2200		Nigeria, Radio/Abuja 7275do		
2100	2200		Nigeria, Radio/Enugu 6025do		
2100	2200		Nigeria, Radio/Ibadan	6050do	
2100	2200		Nigeria, Radio/Kaduna	4770do	6090do
2100	2200		Nigeria, Radio/Lagos 3326do	4990do	
2100	2200		Nigeria, Voice of 15120irr		
2100	2200		Papua New Guinea, NBC	4890do	9675irr
2100	2200		Russia, University Network	9940as	
2100	2200		Sierra Leone, Radio UNAMSIL	6139af	
2100	2200		Sierra Leone, SLBS 3316do		
2100	2200		Syria, Radio Damascus	12085eu	13610eu
2100	2200		UK, BBC World Service	3255af	3915as
			5965as 5975am 6005af	6190af	6195va
			7120af 9410eu 11945as	12095sa	15400af
			17830af		
2100	2200		Ukraine, R Ukraine Intl5905eu		
2100	2200		USA, Armed Forces Network	3903usb	4278usb
			4319usb 4993usb 6350usb	6458usb	10320usb
			12579usb 12689usb	13362usb	
2100	2200		USA, KAIJ Dallas TX 13815va		
2100	2200		USA, KTBN Salt Lk City UT	15590na	
2100	2200		USA, Voice of America 6040eu	6095eu	9530eu
			9705as 9760eu 9850af	11870as	11975af
			13670af 15185as 15410af	15445af	15580af
			17740as 17820as 17895af		
2100	2200		USA, WBCQ Kennebunk, ME	7415na	9329na
			17494na		
2100	2200		USA, WBOH Newport NC	5920am	
2100	2200		USA, WEWN Birmingham AL	13615na	17595eu
2100	2200		USA, WHRA Greenbush ME	17650af	
2100	2200		USA, WHRI Noblesville IN	5745va	9495am
2100	2200		USA, WINB Red Lion PA	13570am	
2100	2200		USA, WJIE Louisville KY	7490am	13595am
2100	2200		USA, WRMI Miami FL 15725na		
2100	2200		USA, WRNO New Orleans LA	7395am	15420al
2100	2200		USA, WSHB Cypress Creek SC	15665af	18910af
2100	2200		USA, WTJC Newport NC	9370na	
2100	2200		USA, WWCR Nashville TN	9475na	12160na
			13845na 15825na		
2100	2200		USA, WWRB Manchester TN	9320na	12172na
2100	2200		USA, WYFR Okeechobee FL	17725sa	17845af
			18930eu 18980eu		
2100	2200	vl	Vanuatu, Radio 3945al	7260do	
2100	2200		Zambia, Christian Voice	4965do	
2115	2130	mtwhf	UK, BBC World Service	11675am	15390am
2115	2200		Egypt, Radio Cairo 9990eu	15375af	
2130	2145	tf	UK, BBC World Service	11720sa	
2130	2156		China, China Radio Intl	15110eu	17790eu
2130	2200		Albania, Radio Tirana Intl	7130eu	9540eu
2130	2200		Australia, ABC NT Alice Springs	2310do	4835irr
2130	2200		Australia, ABC NT Katherine	5025do	
2130	2200		Australia, ABC NT Tennant Crk	4910do	
2130	2200		Guam, AWR/KSDA 11850as	11980as	

2130	2200		Iran, VOIRI9870au 13665au		
2130	2200		Sweden, Radio 6065va	11650as	
2130	2200		Uzbekistan, Radio Tashkent 11905eu	5025eu	9545eu

2200 UTC - 6PM E / 5PM C / 3PM P

2200	2215		New Zealand, Radio NZ Intl	15160pa	
2200	2227		Iran, VOIRI9870au 13665au		
2200	2230		Canada, Radio Canada Intl 13670am 15170am 15455am	9590am 17880am	11920am
2200	2230		India, All India Radio 7410eu 9910au 9950eu 11620va	9445eu 11715au	9575au
2200	2230	s	Ireland, Reflections Europe 12255eu	3910eu	6295eu
2200	2230		Liberia, ELWA 4760do		
2200	2230	mtwhf	Mexico, Radio Mexico Intl	9705am	11770am
2200	2230		Papua New Guinea, NBC	4890do	9675irr
2200	2230	mtwhfs	Serbia & Montenegro, R Yugo	7230au	
2200	2230	mtwhf	USA, Voice of America 9850af 15580af	11975af	13670af
2200	2245		Egypt, Radio Cairo 9990eu		
2200	2256		China, China Radio Intl	9880eu	
2200	2300		Anguilla, Caribbean Beacon	6090am	
2200	2300		Australia, ABC NT Alice Springs	2310do	4835irr
2200	2300		Australia, ABC NT Katherine	5025do	
2200	2300		Australia, ABC NT Tennant Crk	4910do	
2200	2300		Australia, Radio 13620as 17795va 21740va	15230as	17715va
2200	2300		Canada, CBC Northern Service	9625do	
2200	2300		Canada, CFRX Toronto ON	6070do	
2200	2300		Canada, CFVP Calgary AB	6030do	
2200	2300		Canada, CKZN St John's NF	6160do	
2200	2300		Canada, CKZU Vancouver BC	6160do	
2200	2300		Costa Rica, R for Peace Intl	7445am	15038va
2200	2300		Costa Rica, University Network 7375am 9725sa 11870am	5030am 13750na	6150am 17645as
2200	2300		Eqt Guinea, Radio Africa	7189af	15184al
2200	2300	f	Finland, Scandinavian Weekend R	5980va	11720va
2200	2300		Germany, Deutsche Welle	9720as	15605as
2200	2300	vl	Ghana, Ghana BC Corp	3366do	4915do
2200	2300		Guyana, Voice of 3291do	5949do	
2200	2300		Liberia, R Liberia Intl 5100do		
2200	2300		Malaysia, Radio 7295do		
2200	2300		Namibia, NBC 3270af	3290af	6060af
2200	2300		Nigeria, Radio/Abuja 7275do		
2200	2300		Nigeria, Radio/Enugu 6025do		
2200	2300		Nigeria, Radio/Ibadan	6050do	
2200	2300		Nigeria, Radio/Kaduna	4770do	6090do
2200	2300		Nigeria, Radio/Lagos 3326do	4990do	
2200	2300		Nigeria, Voice of 7255af 15120af	9690af	11770af
2200	2300		Russia, University Network	9940as	
2200	2300		Sierra Leone, Radio UNAMSIL	6139af	
2200	2300		Sierra Leone, SLBS 3316do		
2200	2300	vl	Solomon Islands, SIBC 5020do	9545do	
2200	2300		Taiwan, R Taipei Intl 15600eu		
2200	2300		Turkey, Voice of 9830va	12000va	
2200	2300		UK, BBC World Service 6195as 7105as 7120af 12095sa 15400af 17830af	5965as 9740as	5975am 11955as
2200	2300		USA, Armed Forces Network 4319usb 4993usb 6350usb 12579usb 12689usb	3903usb 6458usb 13362usb	4278usb 10320usb
2200	2300		USA, KAIJ Dallas TX 13815va		
2200	2300		USA, KTBN Salt Lk City UT	15590na	
2200	2300		USA, KWHR Naalehu HI	17510as	
2200	2300		USA, Voice of America 7215as 11760as 15185as 15290as 17820as	9705as 15305as	9770as 17740as
2200	2300		USA, WBCQ Kennebunk, ME	7415na	9329na
2200	2300		USA, WBOH Newport NC	5920am	
2200	2300		USA, WEWN Birmingham AL	9975na	17595eu
2200	2300		USA, WHRA Greenbush ME	17650af	
2200	2300		USA, WHRI Noblesville IN	5745va	9495am
2200	2300		USA, WINB Red Lion PA	13570am	
2200	2300		USA, WJIE Louisville KY	7490am	13595am
2200	2300		USA, WRMI Miami FL 15725na		
2200	2300		USA, WRNO New Orleans LA	7395am	15420al
2200	2300		USA, WSHB Cypress Creek SC	13770eu	15285sa
2200	2300		USA, WTJC Newport NC	9370na	
2200	2300		USA, WWCR Nashville TN 12160na 13845na	7465na	9475na
2200	2300		USA, WWRB Manchester TN 6890na	5050na	5085na
2200	2300		USA, WYFR Okeechobee FL 15770af 17845af	11740na	15695eu
2200	2300	vl	Vanuatu, Radio 3945al	7260do	
2200	2300		Zambia, Christian Voice	4965do	
2205	2230		Italy, RAI Intl 11895va		
2216	2300		New Zealand, Radio NZ Intl	17675pa	
2230	2257		Czech Rep, Radio Prague Intl	11600na	13580na
2230	2259		Belgium, Radio Vlaanderen Intl	15565am	
2230	2300		Canada, Radio Canada Intl 15455na	9590na	13670na
2230	2300		Cuba, Radio Havana 6195am	9550na	
2230	2300		Papua New Guinea, NBC	4890do	11880irr
2245	2300		India, All India Radio 9705as 13605as	9950as	11620as

2300 UTC - 7PM E / 6PM C / 4PM P

2300	0000		Anguilla, Caribbean Beacon	6090am	
2300	0000		Australia, ABC NT Alice Springs	2310do	4835irr
2300	0000		Australia, ABC NT Katherine	5025do	
2300	0000		Australia, ABC NT Tennant Crk	4910do	
2300	0000		Australia, Radio 9660pa 13620as 15230as 15415as 21740va	11695as 17715va	12080va 17795va
2300	0000		Bulgaria, Radio 9400na	11900na	
2300	0000		Canada, CBC Northern Service	9625do	
2300	0000		Canada, CFRX Toronto ON	6070do	
2300	0000		Canada, CFVP Calgary AB	6030do	
2300	0000		Canada, CKZN St John's NF	6160do	
2300	0000		Canada, CKZU Vancouver BC	6160do	
2300	0000		Canada, Radio Canada Intl 15455na	9590na	13670na
2300	0000		Costa Rica, R for Peace Intl	7445am	15038am
2300	0000		Costa Rica, University Network 7375am 9725sa 11870am	5030am 13750na	6150am 17645as
2300	0000		Egypt, Radio Cairo 11725na		
2300	0000	f	Finland, Scandinavian Weekend R	5980va	11690va
2300	0000		Germany, Deutsche Welle	9890as	17860as
2300	0000	vl	Ghana, Ghana BC Corp	3366do	4915do
2300	0000		Guyana, Voice of 3291do	5949do	
2300	0000		India, All India Radio 9705as 13605as	9950as	11620as
2300	0000		Malaysia, Radio 7295do		
2300	0000		Namibia, NBC 3270af	3290af	6060af
2300	0000		New Zealand, Radio NZ Intl	17675pa	
2300	0000		Papua New Guinea, NBC	4890do	11880irr
2300	0000		Russia, University Network	9940as	
2300	0000		Sierra Leone, Radio UNAMSIL	6139af	
2300	0000		Sierra Leone, SLBS 3316do		
2300	0000		Singapore, SBC Radio One	6150do	
2300	0000	vl	Solomon Islands, SIBC 5020do	9545do	
2300	0000		UAE, Gospel For Asia 6145as		
2300	0000		UK, BBC World Service 5975am 6195as 7120af 11955as 11955as 12095sa	3915as 9580as 15280as	5965as 9740as
2300	0000		USA, Armed Forces Network 4319usb 4993usb 6350usb 12579usb 12689usb	3903usb 6458usb 13362usb	4278usb 10320usb
2300	0000		USA, KAIJ Dallas TX 13815va		
2300	0000		USA, KTBN Salt Lk City UT	15590na	
2300	0000		USA, KWHR Naalehu HI	17510as	
2300	0000		USA, Voice of America 7215as 7260as 9545as 11760as 13725as 13775as 15185as 15305as 17740as 17820as	7200as 11805as 15205as	7225as 11925as 15290as
2300	0000		USA, WBOH Newport NC	5920am	
2300	0000		USA, WEWN Birmingham AL	9975na	17595eu
2300	0000		USA, WHRA Greenbush ME	7580eu	
2300	0000		USA, WHRI Noblesville IN	5745va	9495am
2300	0000		USA, WINB Red Lion PA	12159am	
2300	0000		USA, WJIE Louisville KY	7490am	13595am
2300	0000	as	USA, WRMI Miami FL 9955am		
2300	0000	mtwhf	USA, WRMI Miami FL 7385na		
2300	0000		USA, WRNO New Orleans LA	7355va	
2300	0000		USA, WTJC Newport NC	9370na	
2300	0000	as	USA, WWBS Macon GA	11910na	
2300	0000		USA, WWCR Nashville TN 9475na 13845na	5070na	7465na
2300	0000		USA, WWRB Manchester TN 6890na	5050na	5085na
2300	0000		USA, WYFR Okeechobee FL 11855sa 15255sa 17750sa	5985sa	11740na
2300	0000	vl	Vanuatu, Radio 3945al	7260do	
2300	0000		Zambia, Christian Voice	4965do	
2300	2305		Nigeria, Radio/Abuja 7275do		
2300	2305		Nigeria, Radio/Enugu 6025do		
2300	2305		Nigeria, Radio/Ibadan	6050do	
2300	2305		Nigeria, Radio/Kaduna	4770do	6090do
2300	2305		Nigeria, Radio/Lagos 3326do	4990do	
2300	2330		China, China Radio Intl	5990na	13680na
2300	2330		Cuba, Radio Havana 6195am	9550na	
2300	2356		Romania, R Romania Intl 11775eu 15105na	9570eu	11740na
2305	2312		Croatia, Croatian Radio	9925sa	
2320	2330		Kyrghyz, Kyrghyz Radio	4010as	4795as
2330	0000		Lithuania, R Vilnius 9875na		
2330	0000		Netherlands, Radio 6165na	9845na	
2330	0000		Switzerland, Swiss R Intl	9885sa	11905sa
2330	2340		Libya, Voice of Africa 15435af	21695af	
2330	2345		Iraq, Radio Iraq Intl 11787irr		
2330	2356		China, China Radio Intl	5990na	13680na
2330	2357		Vietnam, Voice of 9840as	12019as	

Headnote:
Frequencies Emerge for DW in NA

After listening for the first few weeks following the demise of DW's broadcasts in English targeting NA, it appears there are some frequencies targeting other regions that are proving quite reliable at least on the east coast of this continent. (Best frequencies are in bold.)

0400-0500	7225, **11945** kHz
0500-0600	9700, 11925, 12045 kHz
0600-0700	15275, 17860 kHz
2100-2200	11865, **15205** kHz

This month's Guide includes program listings for these broadcasts.

0000 UTC/ 8pm E/5pm P - Page 43 Freqs

SUNDAY
0000 R. for Peace Int. .... World of Radio (Glenn Hauser's comprehensive review of international broadcasting)
R. Netherlands .... Music 52/15 (Hawley or Ohlenschlager present global musical styles)
WBCQ(7415kHz) .... A Different Kind of Oldies Show (unique mix of oldies music with "Big Steve" Cole)
0005 BBCWS(am) .... The Ticket (the world of arts, culture and entertainment with live performances)
R. Australia .... Go Zone (Australian pop music with Kat Perdriau)
0010 R. Japan .... Hello from Tokyo (listener letters, music and short features)
R. Prague .... Saturday Music (Czech classical, folk, jazz or rock music)
R. New Zealand Int. .. The Week in Parliament (a weekly roundup of NZ political news)
0030 R. Netherlands .... Amsterdam Forum (an interactive discussion of topical issues)
R. New Zealand Int. .. Spectrum (a weekly look at the people, places and events around NZ)
0045 R. Ext. de Espana ...... Radio Waves (a weekly program for radio enthusiasts)

MONDAY-FRIDAY
0000 R. New Zealand Int. .. Midday Report (news updates and in-depth reports)

MONDAY
0000 R. Netherlands .... Dutch Horizons (Bertine Krol chronicles life in Holland)
WBCQ(7415kHz) .... Radio New York International (Johnny Lightning plays classic rock)
0005 BBCWS(am) .... Everywoman (a weekly magazine about the world's women)
0010 R. Australia .... Awaye! (Aboriginal arts and culture program)
R. Japan .... Weekend Square (Japan through pleasant conversation and letters)
0015 R. Prague .... Readings from Czech Literature
0030 BBCWS(am) .... Westway Omnibus (a repeat of the week's two episodes of this radio soap)
R. Netherlands .... Aural Tapestry (David Swatling weaves interesting stories using culture and history)
0040 R. Ext. de Espana ...... Radio Club (rebroadcast of A 0035 program)
0054 R. Japan .... Sights and Sounds of Japan

TUESDAY-SATURDAY
0000 R. Ext. de Espana ...... REE's News Service (news, Spanish press review, commentaries, analyses)
VOA News Now (continuous, rolling news service)
0010 R. Japan .... Songs for Everyone
0015 R. Japan .... 44 Minutes (daily current affairs magazine about Japan and Asia)
VOA Focus (top news in perspective)
0032 VOA Coast to Coast (a magazine about American life with Dave Arlington)

TUESDAY
0000 R. Netherlands .... The Research File (a magazine emphasizing the relevance of science to all our lives)
0005 BBCWS(am) .... Various documentary series
0010 R. Australia .... The Science Show (Robyn Williams' long-running program about ideas, not just facts)
0030 BBCWS(am) .... The Music Feature (features and documentaries on current musical genres)

R. Netherlands .... EuroQuest (a magazine placing Europe in context)

WEDNESDAY
0000 R. Netherlands .... Music 52/15 (refer to Sun. 0000)
WBCQ(7415kHz) .... Good Morning Maine!
0005 BBCWS(am) .... Masterpiece (exploring major cultural ideas and great artistic endeavors)
0010 R. Australia .... The National Interest (Terry Lane's round-up of the week's major issues)
0030 BBCWS(am) .... Top of the Pops (music from the British rock and pop charts)
R. for Peace Int. .... Counterspin (media analysis from Fairness and Accuracy in Reporting)
R. Netherlands .... A Good Life (how development affects societies)

THURSDAY
0000 R. Netherlands .... The Weekly Documentary (award-winning essays and in-depth investigations)
0005 BBCWS(am) .... Various documentary series
0010 R. Australia .... Background Briefing (award-winning current affairs radio documentary)
0030 BBCWS(am) .... Charlie Gillett (presents his selection of music from around the globe)
R. Netherlands .... Dutch Horizons (refer to Mon. 0000)

FRIDAY
0000 R. Netherlands .... Aural Tapestry (refer to Mon. 0030)
0005 BBCWS(am) .... Assignment (BBC correspondents' investigative reports)
0010 R. Australia .... Hindsight (Australian social history from the memories of those who were there)
0030 BBCWS(am) .... The Music Biz (a weekly look at the global music industry)
R. Netherlands .... The Research File (refer to Tue. 0000)

SATURDAY
0000 R. Netherlands .... A Good Life (refer to W 0030)
WBCQ(7415kHz) .... Allan Weiner Worldwide (the station manager's show)
0005 BBCWS(am) .... Sports International (the issues and personalities behind the headlines)
R. Australia .... Australian Express (Australian culture and music, Heather Jarvis, Kat Perdriau)
0010 R. New Zealand Int. .. Focus on Politics (a report on government and politics in NZ)
0030 BBCWS(am) .... John Peel (with his own unique and eclectic mix of new music)
R. New Zealand Int. .. The Sampler (Nick Bollinger casts a critical ear over the latest CD offerings)
R. Netherlands .... The Weekly Documentary (refer to H 0000)
0035 R. Exterior de Espana Radio Club (answering listeners' letters)

0100 UTC/ 9pm E/6pm P - Page 43 Freqs

DAILY
0130 R. Austria Int. .... Report from Austria (magazine on Austria and eastern Europe)

SUNDAY
0100 BBCWS(am) .... Play of the Week (classic and contemporary drama for radio)
WBCQ(7415kHz) .... Marion's Attic (rare and vintage recordings presented by Marion Webster)
0105 R. Australia .... Correspondents' Report (correspondents interpret and analyze week's events.
R. Canada Int. .... Business Sense (Canadian companies in the global economy)
R. Netherlands .... Europe Unzipped (the events of the past week in Europe, some unusual)
R. New Zealand Int. .. At the Movies (a weekly report on cinema with Simon Morris)
R. Slovakia Int. .... Insight Central Europe (refer to S 0135 R. Austria Int.)
0110
R. Prague .... Saturday Music (Czech classical, folk, jazz or rock music)
0111 Voice of Russia .... News and Views (Russian views on news developments)
0120 China R. Int. .... In the Spotlight (Chinese arts and cultural magazine)
0130 R. Australia .... Oz Sounds (Australian music and performers)
R. New Zealand Int. .. Bookmarks (NZ books, literature and writers)
RTE Ireland .... Saturday View (main political developments with Rodney Rice)
0132 Voice of Russia .... Moscow Yesterday and Today (recalling interesting Moscow history)
0135 R. Austria Int. .... Insight Central Europe (a joint broadcast production)
R. Canada Int. .... Sci-Tech File (the latest in science and technology developments in Canada)
0140 R. Habana Cuba ..... DXers Unlimited (Arnie Coro program for radio enthusiasts)
0150 R. Austria Int. .... Listener Letters

MONDAY-FRIDAY
0100 R. Australia .... Asia-Pacific (current events and business report, Asia and Pacific)
0105 R. New Zealand Int. .. Cadenza (light classical music selections)

MONDAY
0100 R. Habana Cuba ..... Weekly Review (Cuba's perspective on current events)
WBCQ(7415kHz) .... Radio New York International (continues from 0000)
0105 BBCWS(am) .... Wright Around the World (Steve Wright reads messages and plays requests)
R. Budapest .... Spotlight (a monthly magazine)
Europe Unlimited (Hungary's relations with the rest of Europe)[monthly]
Heading for Hungary (a monthly travelogue)
And the Gatepost (listener letters)[monthly]
R. Canada Int. .... The Maple Leaf Mailbag (Ian Jones answers mail and hosts fortnightly CIDX Report)
R. Netherlands .... Wide Angle (a single issue examined in-depth)
0110 R. Slovakia Int. .... Listeners' Tribune (magazine of letters, features and Slovak music)
Voice of Vietnam ..... Sunday Show (variety magazine with local reports and music)
0115 R. Prague .... Readings from Czech Literature
0130 China R. Int. .... People in the Know (interviews with prominent Chinese)
R. Australia .... The Health Report (Dr. Norman Swan's weekly report on health and medical issues)
RTE Ireland .... This Week (Gerald Barry, Kevin Rafter and Roisin Duffy look back at the week)
0132 Voice of Russia .... Timelines (Estelle Winters' variety show of life in Moscow through foreign eyes)
0135 R. Austria Int. .... Network Europe (a joint broadcast production on Europe)
R. Canada Int. .... Spotlight (magazine of arts and culture in Canada)
0140 R. Habana Cuba ..... The Mailbag Show (listener letters)
0150 R. Habana Cuba ..... Breakthrough (Arnie Coro's weekly science report)

TUESDAY-SATURDAY
0100 R. Netherlands .... Newsline (news, analysis and background reports)
VOA News Now (continuous rolling news service)
0105 R. Budapest .... Hungary Today (current events in Hungary)
R. Canada Int. .... Canada Today (interviews, correspondents, and Canadian views)
Voice of Russia .... Commonwealth Update (comments on domestic issues)
0130 RTE Ireland .... Five Seven Live (Rachael English, magazine on current affairs and popular culture)

TUESDAY
0105 BBCWS(am) .... Health Matters (latest research explaining where medicine is going)
0130 BBCWS(am) .... A panel game or quiz show
China R. Int. .... Biz China (Chinese business and economic development magazine)
R. Australia .... The Law Report (Damien Carrick, breaking legal stories)
0132 Voice of Russia .... Folk Box (musical traditions of the hundreds of regional nationalities)
0135 R. Canada Int. .... Media Zone (Ian Jones, forum with Canadian journalists)
0145 VOA News Now .... Dateline (a daily short documentary)

WEDNESDAY
0105 BBCWS(am) .... Go Digital (technology journalist Tracey Logan explains the latest in IT)
0130 BBCWS(am) .... Music Review (music personalities, views and issues, Andrew Green)
China R. Int. .... China Horizons (life in China outside Beijing)
R. Australia .... The Religion Report (Stephen Crittenden on how religion and societies interact)
0132 Voice of Russia .... The Jazz Show (recordings from the Russian world of jazz)
0135 R. Canada Int. .... Spotlight (refer to M 0135)
0140 R. Habana Cuba ..... DXers Unlimited (refer to S 0140)
0145 VOA News Now .... Dateline (a daily short documentary)

THURSDAY

0105 BBCWS(am) .... Discovery (ideas and discoveries in science and technology)
0130 BBCWS(am) .... Westway (the week's first episode of a radio soap)
R. Australia .... The Media Report (critical look at communications industries, Mick O'Regan)
0135 R. Canada Int. .... The Maple Leaf Mailbag (refer to M 0105)
0145 VOA News Now .... Dateline (a daily short documentary)

FRIDAY

0105 BBCWS(am) .... One Planet (stories about human impact on natural world)
0130 BBCWS(am) .... The Word (Harriett Gilbert looks at the myriad world of writing)
[exc. last F] World Book Club (an author answers listener questions)
R. Australia .... The Sports Factor (the cultural significance of sport, Warwick Hadfield)
0135 R. Canada Int. .... Business Sense (refer to S 0105)
0145 VOA News Now .... Dateline (a daily brief documentary)

SATURDAY

0100 WBCQ(7415kHz) .... Tasha Takes Control (upbeat progressive music)
0105 BBCWS(am) .... Science in Action (current developments in science and technology)
R. Australia .... Asia-Pacific Weekend Edition (regional current events and business report)
R. New Zealand Int. .. Digital Life (technology issues, latest global news, new techno-comedy drama, Simon Morton)
0120 R. Budapest .... DX Corner (a report for radio hobbyists)
China R. Int. .... Cutting Edge (science and technology in China)
0130 BBCWS(am) .... Westway (the week's second episode of a radio soap)
China R. Int. .... Listeners Garden (letters, language lesson and other features)
R. Australia .... Music Deli (folk, traditional, acoustic and world music with Paul Petran)
0133 VOA News Now .... VOA News Review (report on the past week's news)
0135 R. Canada Int. .... Sci-Tech File (refer to S 0135)
0145 VOA Special Eng. .... American Stories (short stories by American authors)

0200 UTC/ 10pm E/7pm P - Page 44 Freqs

DAILY

0200 BBCWS(am) .... The World Today (the BBC's agenda-setting flagship global news program)

SUNDAY

0200 WBCQ(7415kHz) .... Pocket Calculator (celebrating integrated circuit-based consumer products of the 1970s and 80s)
0205 R. Australia .... Margaret Throsby (a guest is interviewed and presents favorite musical pieces)
0211 Voice of Russia .... Moscow Mailbag (Joe Adamov on questions, rumors and jokes)
0215 R, Korea Int. .... Worldwide Friendship (a program promoting RKI's interactive contact with listeners)
R. Taipei Int. .... Great Wall Forum (the China-Taiwan issue from Taipei's perspective)
0230 BBCWS(am) .... World Business Review (analysis of global business developments)
R. New Zealand Int. .. Health Matters or Environment Matters
R. Sweden .... Network Europe (a magazine about Europe on the 1st week of the month)
Sweden Today (George Wood presents the voices of Sweden, 2nd week)
Spectrum (Bill Schiller covers the Swedish cultural scene, 3rd week)
Studio 49 (ideas and long-term trends in the Nordic region, the 4th week)
WHRA(7580kHz) ...... DXing with Cumbre (Marie Lamb with the latest DX catches)
WWCR(5070kHz) .... World of Radio (Glenn Hauser's comprehensive review of international broadcasting)
0232 Voice of Russia .... Songs from Russia (melodies and musical novelties from Russia's past)
0235 R. Habana Cuba ..... The World of Stamps (perhaps the only program on philatelic matters)

MONDAY-FRIDAY

0205 R. New Zealand Int. .. In Touch with NZ—Wayne's Music (Wayne Mowat, featuring themed popular music)
0210 R. Australia .... The World Today (comprehensive current affairs program, Eleanor Hall)

MONDAY

0200 WBCQ(7415kHz) .... Radio New York International (continues from 0000)
0210 R. Habana Cuba ..... From Havana (a showcase of contemporary Cuban music and musicians)
0211 Voice of Russia .... Moscow Mailbag (refer to S 0211)
0215 R. Korea Int. .... Korean Pop Interactive (Korean cutting edge pop music, oldies and artist interviews)
R. Taipei Int. .... Jade Bells and Bamboo Pipes (Carson Wong, traditional Chinese music)
0230 R. Habana Cuba ..... The Jazz Place (the very best of Cuban jazz) or Top Tens (contemporary Cuban hits)
R. Sweden .... In Touch with Stockholm (interactive listener program w/Nidia Hagström, 1st week)
Sounds Nordic (R. Sweden's youth music and trends magazine w/Gaby Katz)[exc. 1st week]
0232 Voice of Russia .... This is Russia (cities and regions, culture and arts, countryside, religion and people)
0235 R. Budapest .... (refer to M 0105)
0245 BBCWS(am) .... The Instant Guide (concise explanations of topical subjects)

TUESDAY-SATURDAY

0215 R. Korea Int. .... Seoul Calling (daily feature magazine of Korean people, places and events)
0230 R. Sweden .... Sixty Degrees North (reports, interviews and analysis on the Nordic region)
0235 R. Budapest .... Hungary Today (a daily magazine covering current events in Hungary)

TUESDAY

0211 Voice of Russia .... Science and Engineering (the latest developments in science and technology)
0230 BBCWS(am) .... World Business Report (the main business issues of the day)
0232 Voice of Russia .... Kaleidoscope (the latest economic, social and cultural events in Russia and the CIS)
0245 BBCWS(am) .... Analysis (background to the stories in the news)
R. Korea Int. .... Korea Today and Tomorrow (the latest developments on the Korean peninsula)

WEDNESDAY

0211 Voice of Russia .... Newmarket (business in Russia and Russia in international business)
0230 BBCWS(am) .... World Business Report (the main business issues of the day)
0245 BBCWS(am) .... Analysis (refer to T 0245)
R. Korea Int. .... Korean Kaleidoscope (Korean social and economic life)
R. Sweden .... Close Up (profiles of people in Sweden from all walks of life)[1st/3rd wk.]

THURSDAY

0211 Voice of Russia .... Moscow Mailbag (refer to S 0211)
0215 R. Taipei Int. .... Journey into Chinese Culture
0230 BBCWS(am) .... World Business Report (the main business issues of the day)
0232 Voice of Russia .... Moscow Yesterday and Today (recalling interesting events in Moscow history)
0245 BBCWS(am) .... From Our Own Correspondent (the background to international events)
0245 R. Korea Int. .... Wonderful Korea (a travelogue)
R. Sweden .... Money Matters (a weekly economic report on the Nordic region)

FRIDAY

0211 Voice of Russia .... Science and Engineering (refer to T 0211)
0230 BBCWS(am) .... World Business Report (the main business issues of the day)
0232 Voice of Russia .... Russian by Radio (a language lesson)
0245 BBCWS(am) .... Analysis (refer to T 0211)
0245 R. Korea Int. .... Seoul Report (interviews with Koreans and visitors to Korea from all walks of life)
R. Sweden .... Nordic Lights (a monthly magazine on Scandinavia, first week)
Greenscan (Azariah Kiros, Swedish environmental awareness, second week)
Heart Beat (Gaby Katz, health and medical magazine, third week)
The S-Files (Kris Boswell, Sweden behind the headlines, fourth week)

SATURDAY

0205 R. Australia .... Background Briefing (refer to H 0010)
R. New Zealand Int. .. Eureka! (reports on science in NZ)
0211 Voice of Russia .... Newmarket (refer to W 0211)
0230 BBCWS(am) .... Global Business (Peter Day looks at trends and ideas shaping business)
R. New Zealand Int. .. Health Matters or Environment Matters
0232 Voice of Russia .... Audio Book Club (readings from Russian classic and contemporary literature)

0300 UTC/ 11pm E/8pm P - Page 44 Freqs

SUNDAY

0300 R. Vlaanderen Int. .... Music from Flanders Flemish music and musical performances)
WWCR(5070kHz) .... Spectrum (communications magazine/phone-in)
0305 BBCWS(am) .... From Our Own Correspondent (the background to international events)
R. Australia .... Feedback (Roger Broadbent answers and updates about RA)
0310 R. Prague .... Saturday Music (Czech classical, folk, jazz or rock music)
0320 China R. Int. .... In the Spotlight (refer to S 0120)
0330 BBCWS(am) .... People and Politics (inside British politics)
R. Australia .... Jazz Notes (with Ivan Lloyd)
R. Sweden .... Weekend (refer to S 0230)
Sweden Today (refer to S 0230)
Spectrum (refer to S 0230)
Studio 49 (refer to S 0230)
WRMI(7385kHz) ...... Viva Miami (R. Miami Int.'s listener magazine show)
0332 VOA Africa .... Issues in the News (3 Washington journalists discuss the week's top stories)
Voice of Russia .... Kaleidoscope (refer to T 0232)
0340 R. Habana Cuba ..... DXers Unlimited (Arnie Coro presents a program for radio enthusiasts)

MONDAY-FRIDAY

0300 VOA Africa .... Daybreak Africa (morning news, music and features magazine for Africa)
0320 R. Australia .... Life Matters (a daily interview program about social change and day-to-day life.)

MONDAY

0300 R. Habana Cuba ..... Weekly Review (Cuba's perspective on current events)
R. Vlaanderen Int. .... Radio World (Frans Vossen, report about international radio)
WBCQ(7415kHz) .... Radio New York International (continues from 0000)
0305 BBCWS(am) .... Talking Point (listeners and internet users put questions to guests on current affairs)
R. New Zealand Int. .. Tagata o te Moana (Anita Purcell, regional Pacific news, issues, information and music.)
0315 R. Prague .... Readings from Czech Literature
Radio Taipei Int. .... Taiwan Economic Journal
0330 China R. Int. .... People in the Know (refer to M 0130)
R. Sweden .... In Touch with Stockholm (refer to M 0230)
Sounds Nordic (refer to M 0230)
WHRI(7315kHz) .... Dxing with Cumbre (refer to S 0230)
WRMI(7385kHz) ...... Wavescan (program for DXers and shortwave radio enthusiasts)
0332 Voice of Russia .... Audio Book Club (refer to A 0232)
0340 R. Habana Cuba ..... The Mailbag Show (listener letters)
0350 R. Habana Cuba ..... Breakthrough (Arnie Coro's weekly science report)

TUESDAY-SATURDAY

0305 BBCWS(am) .... Outlook (topical magazine of people and places)
0311 Voice of Russia .... News and Views (Russian views on news developments)
0330 R. Sweden .... Sixty Degrees North (refer to T-A 0230)
0345 BBCWS(am) .... Off the Shelf (abridged serialized readings of novels, stories and other literature)

TUESDAY

0305 R. New Zealand Int. .. Top Five and New Releases (new music releases in NZ with Greg Tatere)
0315 R. Taipei Int. .... Jade Bells and Bamboo Pipes (refer to M 0215)
0330 China R. Int. .... Biz China (refer to T 0130)

Shortwave Guide

WEDNESDAY
0305 R. New Zealand Int. .. Pacific Report (Don Wiseman interviews and reports on regional matters)
0330 R. New Zealand Int. .. Tradewinds (Walter Zweifel, Pacific regional business and economic news)
0340 R. Habana Cuba ..... DXers Unlimited (refer to S 0340)
0345 R. Sweden .... Close Up (refer to W 0245)

THURSDAY
0305 R. New Zealand Int. .. RNZI Talk (fortnightly introduction to staff and programs) [or]
Mailbox (fortnightly program for SWLs, Myra Oh answers letters, Paul Ormandy reports DX news, and Adrian Sainsbury answers technical questions)
0330 R. New Zealand Int. .. The World in Sport (Dmitri Edwards, highlights of the world's sporting week)

FRIDAY
0305 R. New Zealand Int. .. Dateline Pacific (major Pacific stories, background and reaction from the people making the news, Don Wiseman)
0330 China R. Int. .... Life in China (refer to F 0130)
R. New Zealand Int. .. Pacific Correspondent (regional correspondents talk to Don Wiseman)
0340 R. Australia .... Jazz Notes (Australian jazz presented by Ivan Lloyd)
0345 R. Sweden .... Nordic Lights (refer to F 0245)
Greenscan (refer to F 0245)
Heart Beat(refer to F 0245)
The S-Files (refer to F 0245)

SATURDAY
0305 R. Australia .... Rural Reporter news and stories from rural and regional Australia)
R. New Zealand Int. .. The Mix (interviews and live recordings from contemporary pop musicians)
0330 R. Australia .... Australian Country Style (Australian country music with John Nutting)
0332 VOA Africa .... Our World (issues in science, technology, agriculture and environment, Rob Sivak)

0400 UTC/ 12am E/9pm P - Page 45 Freqs

DAILY
0400 BBCWS(am) .... World Briefing (extended newscast)

SUNDAY
0400 WBCQ(7415kHz) .... Tom and Darryl (satellite TVRO, shortwave, low power FM and the Internet)
0405 Deutsche Welle .... Inside Europe (newsmagazine exploring the issues shaping the continent)
R. Australia .... All in the Mind (foray into the mental universe and behavior, Natasha Mitchell)
R. New Zealand Int. .. Playhouse (classic and contemporary radio drama)
0420 China R. Int. .... In the Spotlight (refer to S 0120)
0430 BBCWS(am) .... World Business Review (the past week in business and finance)
R. Australia .... In Conversation (Robyn Williams talks to scientists about what it's meant to their lives)
0432 Voice of Russia .... Moscow Yesterday and Today (refer to S 0132)
0435 R. Habana Cuba ..... The World of Stamps (refer to S 0235)
R. Netherlands .... Wide Angle (a single issue examined in-depth)
0445 BBCWS(am) .... The Instant Guide (refer to M 0245)
0455 R. Netherlands .... Insight (Rob Green casts a critical and humorous eye on the headlines)

MONDAY-FRIDAY
0400 WBCQ(7415kHz) .... Amos 'n Andy (the classic radio comedy from America's radio past)
0405 Deutsche Welle .... Mailbag Africa (a listener contact program keying on DW's African audience)
R. New Zealand Int. .. In Touch with New Zealand (continues from 0205, this hour including a daily report from one of NZ's regions)
0410 R. Australia .... Margaret Throsby (a guest is interviewed and presents favorite musical pieces)
0430 BBCWS(am) .... The World Today (the BBC's agenda-setting flagship news program)

MONDAY
0410 R. Habana Cuba ..... From Havana (refer to M 0210)
0430 China R. Int. .... People in the Know (refer to M 0130)
R. Habana Cuba ..... The Jazz Place or Top Tens (refer to M 0230)
0432 Voice of Russia .... The Jazz Show (refer to W 0132)
0435 R. Netherlands .... Sincerely Yours (RN's listener response program)
0455 R. Netherlands .... The Week Ahead (on RN the next seven days)

TUESDAY-SATURDAY
0405 Deutsche Welle .... Newslink Africa (world events with special emphasis on the way they affect Africa)
0430 R. Netherlands .... Newsline (refer to T-A 0100)

TUESDAY
0411 Voice of Russia .... Moscow Mailbag (refer to S 0211)
0430 China R. Int. .... Biz China (refer to T 0130)
Deutsche Welle .... Insight (putting the news in perspective)
0445 Deutsche Welle .... Business German (the German language in the world marketplace)

WEDNESDAY
0411 Voice of Russia .... Science and Engineering (refer to T 0211)
0430 Deutsche Welle .... World in Progress (a fresh look at development issues)

THURSDAY
0411 Voice of Russia .... Newmarket (refer to W 0211)
0430 Deutsche Welle .... Money Talks (finance and economics magazine from the heart of Europe)
0432 Voice of Russia .... Folk Box (refer to T 0132)

FRIDAY
0411 Voice of Russia .... Moscow Mailbag (refer to S 0211)
0430 China R. Int. .... Life in China (refer to F 0130)
Deutsche Welle .... Man and Environment (examining major environmental developments)
0432 Voice of Russia .... Audio Book Club (refer to A 0232)

SATURDAY
0400 WBCQ(7415kHz) .... Amos 'n Andy (refer to M-F 0400)
0405 R. Australia .... The Business Report (latest business news presented by Elizabeth Jackson)
R. New Zealand Int. .. Home Grown (Liz Barry plays contemporary Kiwi music)
0411 Voice of Russia .... Science and Engineering (refer to T 0211)
0430 BBCWS(am) .... World Business Report
Deutsche Welle .... Spectrum (developments in the fields of science and technology)
R. Australia .... The Australian Music Show (the latest Australian music with Kat Perdriau)
R. New Zealand Int. .. Musical Chairs (the music and background of a featured NZ musician)
WHRA(7415kHz) ...... Dxing with Cumbre (Marie Lamb with the hottest DX catches)
0432 Voice of Russia .... Timelines (life in Moscow through foreign eyes, Estelle Winters)
0445 BBCWS(am) .... Letter from America (Alistair Cooke's weekly essay on life in America)

0500 UTC/ 1am E/10pm P - Page 45 Freqs

SUNDAY
0500 R. Netherlands .... Amsterdam Forum (an interactive discussion of topical issues)
WBCQ(7415kHz) .... Tom and Darryl (continues from 0400 on 1st and 3rd Sun.)
0505 Deutsche Welle .... Religion and Society (insight into religious events throughout the world)
R. Australia .... The Europeans (political, cultural, economic and social developments across Europe)
0510 R. Japan .... Pop Joins the World (Asian countries through their popular music)
R. New Zealand .... Feature on religion and spirituality in NZ
0515 Deutsche Welle .... German by Radio (a weekly language lesson)
0520 China R. Int. .... In the Spotlight (refer to S 0120)
0530 Deutsche Welle .... Africa This Week (comprehensive look at Africa, Carla Gehrmann-Zellen)
R. Australia .... The Ark (historians talk about curious moments in religious history, Rachael Kohn)
0540 R. Habana Cuba ..... DXers Unlimited (refer to S 0140)

MONDAY-FRIDAY
0500 Channel Africa .... Dateline Africa (a daily actuality magazine focusing on African events and issues)
0505 R. New Zealand Int. .. Checkpoint (RNZ National Radio's flagship evening news program)
0510 R. Australia .... Pacific Beat (current events and features on the Pacific island nations)
0515 R. Japan .... 44 Minutes (a daily current affairs magazine about Japan and Asia)

MONDAY
0500 R. Habana Cuba ..... Weekly Review (refer to S 0100)
R. Netherlands .... Dutch Horizons (Bertine Krol chronicles life in Holland)
0505 Deutsche Welle .... Hard to Beat (the latest in sports from Germany and the world)
0515 Deutsche Welle .... Inspired Minds (profiles of and interviews with creative and industrious people)
0530 China R. Int. .... People in the Know (refer to M 0130)
Deutsche Welle .... Hits in Germany (with Deborah Friedman)[fortnightly]
Melody Time (light classical favorites with Diane Erickson) [fortnightly]
0540 R. Habana Cuba ..... The Mailbag Show (listener letters)
0550 R. Habana Cuba ..... Breakthrough (Arnie Coro with a report on science)

TUESDAY-SATURDAY
0505 Deutsche Welle .... Newslink Africa (refer to T-A 0405)

TUESDAY
0500 R. Netherlands .... The Research File (a magazine emphasizing the relevance of science to all our lives)
0530 China R. Int. .... Biz China (refer to T 0130)
Deutsche Welle .... World Music Live

WEDNESDAY
0500 R. Netherlands .... Music 52/15 (Hawley or Ohlenschlager present global musical styles)
0530 Deutsche Welle .... Arts on the Air (an award-winning weekly cultural magazine)
0540 R. Habana Cuba ..... DXers Unlimited (refer to S 0140)

THURSDAY
0500 R. Netherlands .... The Weekly Documentary (RN's award-winning sound essays and in-depth investigations)
0530 Deutsche Welle .... Living in Germany (aspects of life in Germany)
0545 Deutsche Welle .... Europe on Stage

FRIDAY
0500 R. Netherlands .... Aural Tapestry (David Swatling weaves interesting stories using culture and history)
0530 China R. Int. .... Life in China (a weekly magazine focusing on the lives of ordinary people in China)
Deutsche Welle .... Cool! (the latest in youth culture in Germany and abroad)
R. New Zealand Int. .. The Pacific Report (a report on trends and events in the Pacific region)

SATURDAY
0500 R. Netherlands .... A Good Life (how development affects societies)
WHRI Indiana .... Dxing with Cumbre (Marie Lamb with the hottest DX catches)
0505 R. Australia .... Ockham's Razor (a "sharp" commentary on a science-related issue)
R. New Zealand Int. .. Home Grown (continues from 0405)
0510 R. Japan .... Hello from Tokyo (listener letters, music and short features)
0520 R. Australia .... Lingua Franca (language and its social, cultural and historical ramifications)
0530 Deutsche Welle .... Focus on Folk (Angelika Ditscheid with real German folk music, origins and performers)
R. Australia .... Fine Music Australia (Australian classical artists with Charles Southwood)

0600 UTC/ 2am E/11pm P - Page 46 Freqs

SUNDAY
0605 Deutsche Welle .... Inside Europe (refer to S 0405)
R. Australia .... The Arts on RA (an arts-related interview and film review)
R. New Zealand Int. .. Whenua! (people, issues and music in Aetearoa, with Henare te Ua and Libby Hakaraia)
0610 R. Japan .... Weekend Japanology (Japan through pleasant conversation with guests and letters)
0630 R. Australia .... Blacktracker (Aboriginal contemporary music with Mal Honess)

0633 VOA Africa .... Main Street (ideas, information, people and places across America, Barbara Klein)
0635 R. Habana Cuba ..... The World of Stamps (refer to S 0135)
0654 R. Japan .... Sights and Sounds of Japan

MONDAY-FRIDAY
0600 Channel Africa .... Dateline Africa (a daily actuality magazine focusing on African events and issues)
0605 R. New Zealand Int. .. What's Going On? (daily NZ entertainment and arts calendar)
0610 R. Japan .... Songs for Everyone
0615 R. Japan .... Asian Top News (major stories as reported by the region's radio stations)
0630 R. New Zealand Int. .. Worldwatch (the stories behind international headlines)
0645 R. New Zealand Int. .. Storytime (children's stories)

MONDAY
0605 Deutsche Welle .... Mailbag Africa (refer to M 0405)
0610 R. Habana Cuba ..... From Havana (refer to M 0210)
0620 R. Australia .... Ockham's Razor (a "sharp" commentary on a science-related issue)
0625 R. Japan .... Japan Music Treasure Box (classic Japanese popular music)
0630 R. Habana Cuba ..... The Jazz Place or Top Tens (refer to M 0230)
0640 R. Australia .... The Australian Music Show (the latest Australian music with Kat Perdriau)

TUESDAY-SATURDAY
0605 Deutsche Welle .... Newslink Africa (refer to T-A 0405)

TUESDAY
0620 R. Australia .... In Conversation (refer to S 0430)
0625 R. Japan .... Basic Japanese for You (a Japanese language lesson for beginners)
0630 Deutsche Welle .... Insight (refer to T 0430)
0640 R. Australia .... Music Deli (refer to A 0130)
0645 Deutsche Welle .... Business German (refer to T 0445)

WEDNESDAY
0620 R. Australia .... Lingua Franca (refer to A 0520)
0625 R. Japan .... Japan Musicscape (music and writings on a selected theme)
0630 Deutsche Welle .... World in Progress (refer to W 0430)
0640 R. Australia .... Blacktracker (refer to S 0630)

THURSDAY
0620 R. Australia .... The Ark (refer to S 0530)
0625 R. Japan .... Brush Up Your Japanese (an intermediate course in Japanese)
0630 Deutsche Welle .... Money Talks (refer to H 0430)
0640 R. Australia .... Australian Country Style (refer to A 0330)

FRIDAY
0620 R. Australia .... The Makers (an interview with an Australian artist)
0625 R. Japan .... Music Beat (contemporary Japanese popular music)
0630 Deutsche Welle .... Man and Environment (refer to F 0430)
0640 R. Australia .... Jazz Notes (with Ivan Lloyd)

SATURDAY
0605 R. Australia .... Feedback (Roger Broadbent answers and updates about RA)
R. New Zealand Int. .. Tagata o te Moana (regional Pacific news, issues, information and music, Anita Purcell)
0610 R. Japan .... Pop Joins the World (Asian countries through their popular music)
0630 Deutsche Welle .... Spectrum (refer to A 0430)
R. Australia .... Oz Sounds (Australian new music releases)

1000 UTC/6am E/3am P - Page 47 Freqs

DAILY
1000 VOA News Now (continuous rolling news service with analysis, sports, business reports and topical features)

SUNDAY
1005 BBCWS(am) .... From Our Own Correspondent (refer to H 1130)
R. Australia .... Go Zone (Australian pop music with Kat Perdriau)
1010 R. New Zealand Int. .. Mediawatch (analyses of recent media events and trends in NZ)
1030 BBCWS(am) .... Reporting Religion (Trevor Barnes on how religion shapes major news events, analysis of ethical issues)
1033 VOA News Now .... Main Street (refer to S 0633)
1035 R. Netherlands .... Wide Angle (a weekly in-depth look at a news topic)
1055 R. Netherlands .... The Week Ahead (on RN the next seven days)

MONDAY
1030 R. Australia .... The Health Report (Dr. Norman Swan's report on health and medical issues)
1033 VOA News Now .... Main Street (refer to S 0633)

MONDAY-FRIDAY
1000 BBCWS(am) .... World Briefing (a comprehensive report on the latest news)
R. New Zealand Int. .. Late Edition (major domestic evening news magazine)
1005 R. Australia .... Asia-Pacific (current events and business report, Asia and Pacific)
1030 BBCWS(am) .... World Business Report (a guide through the day's business issues)
R. Netherlands .... Newsline (news, analysis and background reports)
1045 BBCWS(am) .... Sports Roundup

TUESDAY
1030 R. Australia .... The Law Report (Damien Carrick, breaking legal stories)
1033 VOA News Now .... Main Street (refer to S 0633)

WEDNESDAY
1030 R. Australia .... The Religion Report (Stephen Crittenden on how religion and societies interact)
1033 VOA News Now .... Main Street (refer to S 0633)

THURSDAY
1030 R. Australia .... The Media Report (critical look at communications industries, Mick O'Regan)
1033 VOA News Now .... Main Street (refer to S 0633)

FRIDAY
1030 R. Australia .... The Sports Factor (debates and celebrates the cultural significance of sport)
1033 VOA News Now .... On the Line (US foreign policy discussed and debated)

SATURDAY
1000 WWCR(5070kHz) .... The Old Record Shop (vintage recordings)
1005 BBCWS(am) .... Assignment (BBC correspondents' investigative reports)
R. Australia .... Pacific Review (top reports from the past week's Asia Pacific magazine)
1010 R. New Zealand Int. .. Deep Purple (relaxing, thoughtful and nostalgic music)
1030 BBCWS(am) .... Agenda (ideas and trends shaping our world)
R. Australia .... In Conversation (Robin Williams talks to scientists about what it's meant to their lives)
1033 VOA News Now .... On the Line (refer to F 1033)
1035 R. Netherlands .... Europe Unzipped (the events of the past week in Europe, some unusual)
1055 R. Netherlands .... Insight (Rob Green casts a critical and humorous eye on the past week's headlines) ....

1100 UTC/ 7am E/4am P - Page 48 Freqs

DAILY
1100 BBCWS(am) .... World Briefing (a comprehensive report on the latest news)

SUNDAY
1100 R. Netherlands .... Aural Tapestry (David Swatling weaves interesting stories using culture and history)
1105 R. Australia .... Correspondents' Report (interpretation and analysis of the week's major events)
R. New Zealand Int. .. New Zealand Forces Program (programs for NZ military and civilian personnel stationed in East Timor and Papua-New Guinea, 2 hrs)
1110 R. Japan .... Hello from Tokyo (listener letters, music and short features)
1130 R. Australia .... The Arts on RA (an arts-related interview and film review)
BBCWS(am) .... Letter from America (Alistair Cooke's weekly essay about life in America)
1130 R. Netherlands .... Dutch Horizons (Bertine Krol chronicles life in Holland)
R. Sweden .... In Touch with Stockholm (interactive listener contact program, Nidia Hagström, 1st weekend)
Sounds Nordic (youth music and trends magazine, Gaby Katz, all weekends but first)
1140 R. Korea Int. .... Korean Pop Interactive (Korean cutting edge pop music, oldies and artist interviews)

MONDAY-FRIDAY
1105 BBCWS(am) .... Caribbean Report (the latest news in the Caribbean)
R. Australia .... Asia-Pacific (current events and business report, Asia and Pacific)
1110 BBCWS(am) .... Caribbean Sport
R. Japan .... Songs for Everyone
1115 BBCWS(am) .... Caribbean Magazine (life in the region)
R. Japan .... Asian Top News (the day's major stories as reported by the region's radio stations)
1130 R. Australia .... Bush Telegraph (an entertaining look at rural and regional issues in Australia)
1130 R. Sweden .... Sixty Degrees North (reports, interviews and analysis on the Nordic region)
1145 R. Korea Int. .... Seoul Calling (daily feature magazine of Korean people, places and events)

MONDAY
1100 R. Netherlands .... EuroQuest (a magazine placing Europe in context)
1105 R. New Zealand Int. .. Nine to Noon (domestic program featuring news stories and topics of interest)
1125 R. Japan .... Japan Music Treasure Box (refer to M 0625)
1130 BBCWS(am) .... The Instant Guide (concise explanations of topical subjects)
R. Netherlands .... The Research File (a magazine on the relevance of science to our lives)
1145 BBCWS(am) .... Sports Round-up (all the daily sporting news worldwide)
R. Sweden .... Sports Scan (a weekly report on sports in the Nordic region)

TUESDAY
1100 R. Netherlands .... A Good Life (how development affects societies)
1105 R. New Zealand Int. .. Nine to Noon (domestic program featuring news stories and topics of interest)
1125 R. Japan .... Basic Japanese for You (refer to T 0625)
1130 BBCWS(am) .... Analysis (background to stories in the news)
R. Netherlands .... Music 52-15 (Martha Hawley or Max Ohlenschlager, musical styles from around the globe)
1145 BBCWS(am) .... Sports Round-up (all the daily sporting news worldwide)
R. Sweden .... Close Up (profiles of people in Sweden from all walks of life)[1st/3rd T]

WEDNESDAY
1100 R. Netherlands .... Dutch Horizons (Bertine Krol chronicles life in Holland)
1105 R. New Zealand Int. .. Nine to Noon (domestic program featuring news stories and topics of interest)
1125 R. Japan .... Japan Musicscape (refer to W 0625)
1130 BBCWS(am) .... Analysis (background to stories in the news)
R. Netherlands .... The Weekly Documentary (award-winning sound essays and in-depth investigations)
1145 BBCWS(am) .... Sports Round-up (all the daily sporting news worldwide)

THURSDAY
1100 R. Netherlands .... The Research File (a magazine on the relevance of science to all our lives)

1105 R. New Zealand Int. .. Nine to Noon (repeat of portions of a late morning domestic program)
1125 R. Japan .... Brush Up Your Japanese (refer to H 0625)
1130 BBCWS(am) .... From Our Own Correspondent (background to the news from BBC correspondents)
R. Netherlands .... Aural Tapestry (David Swatling weaves interesting stories using culture and history)
1145 BBCWS(am) .... Sports Round-up (all the daily sporting news worldwide)
R. Sweden .... Nordic Lights (a monthly magazine on Scandinavia, 1st week)
Greenscan (Swedish environmental awareness and challenges, Azariah Kiros, 2nd wk)
Heart Beat (health and medical magazine, Gaby

Katz, 3rd wk)
The S-Files (Sweden behind the headlines, Kris Boswell, 4th wk)

FRIDAY
1100 R. Netherlands .... The Weekly Documentary (RN's award-winning sound essays and in-depth investigations)
1105 R. New Zealand Int. .. Sports Story (a sport profile or documentary)
1125 R. Japan .... Music Beat (refer to F 0625)
1130 BBCWS(am) .... Analysis (background to stories in the news)
R. Netherlands .... A Good Life (how development affects societies)
R. New Zealand Int. .. RNZI Top Five (the best-selling music in NZ)
1145 BBCWS(am) .... Football Extra (global soccer news, reviews and interviews)
R. Sweden .... A Report on the Nordic Newsweek (the week's main news stories)

SATURDAY
1100 R. Netherlands .... Amsterdam Forum (an interactive discussion of topical issues)
1105 R. Australia .... Asia Pacific Weekend Edition (current events and business report for and about region)
R. New Zealand Int. .. New Zealand Forces Program (programs for NZ military and civilian personnel stationed in East Timor and Papua-New Guinea, 2 hrs)
1110 R. Japan .... Pop Joins the World (refer to A 0610)
1130 BBCWS(am) .... World Football (soccer around the world with Alan Greene)
R. Australia .... The Europeans (political, cultural, economic and social developments, Gary Bryson)
R. Netherlands .... Music 52-15 (Hawley or Ohlenschlager, musical styles from around the globe)
R. Sweden .... Weekend (a magazine about Europe from the Radio E consortium, 1st week)
Sweden Today (George Wood presents the voices of Sweden, 2nd week)
Spectrum (Bill Schiller covers the Swedish cultural scene, 3rd week)
Studio 49 (ideas and long-term trends in Nordic region, 4rth week)
1135 R. New Zealand Int. .. Dateline Pacific (major stories, background and reaction from the people in the news, Don Wiseman)
1140 R. Korea Int. .... Worldwide Friendship (interactive contact with listeners)
1145 BBCWS(am) .... Sports Round-up (all the daily sporting news worldwide)

1200 UTC/ 8am E/5am P - Page 48 Freqs

DAILY
1200 BBCWS(am) .... Newshour (an hour of news and analysis from around the globe)

SUNDAY
1200 R. for Peace Int. .... World of Radio (Glenn Hauser's comprehensive review of international broadcasting)
1205 R. Australia .... The Spirit of Things (Dr. Rachael Kohn on contemporary values and beliefs expressed in ritual, art, music, and sacred texts)
R. Netherlands .... Sincerely Yours (RN's listener response program)
R. New Zealand Int. .. Sportsworld (a round-up of the weekend's sporting events in and around NZ)
1230 R. Sweden .... In Touch with Stockholm (interactive listener program with Nidia Hagström, 1st week)
Sounds Nordic (youth music and trends magazine, Gaby Katz, every weekend but first.)

MONDAY-FRIDAY
1200 R. Netherlands .... Newsline (news, analysis and background reports)
1205 BBCWS(am) .... Caribbean Business (a report on regional commerce and economics)
R. New Zealand Int. .. Late Edition (repeat of 1005 program)
1210 BBCWS(am) .... Caribbean Report (the latest news in the Caribbean)
1210 R. Canada Int. .... The Current (perspectives, ideas and voices on Canadian issues, Anna Maria Tremonti)
1230 R. Sweden .... Sixty Degrees North (reports, interviews and analysis on the Nordic region)

MONDAY
1205 R. Australia .... Late Night Live (Philip Adams interviews newsmakers, philosophers, artists and trendsetters)
1215 R. Korea Int. .... Korea Today and Tomorrow (latest developments on the Korean peninsula)
1230 R. for Peace Int. .... World of Radio (refer to S 1200)
1245 R. Sweden .... Sports Scan (a weekly report on sports in the Nordic region)

TUESDAY
1205 R. Australia .... Late Night Live (refer to M 1205)
1215 R. Korea Int. .... Korean Kaleidoscope (a magazine of Korean social and economic life)
1245 R. Sweden .... Close Up (profiles of people in Sweden from all walks of life)[1st/3rd T]

WEDNESDAY
1205 R. Australia .... Late Night Live (refer to M 1205)
1215 R. Korea Int. .... Wonderful Korea (touring Korea)

THURSDAY
1205 R. Australia .... Late Night Live (refer to M 1205)
1215 R. Korea Int. .... Seoul Report (interviews with Koreans and visitors to Korea from all walks of life)
1245 R. Sweden .... Nordic Lights (a monthly magazine on Scandinavia, 1st week)
Greenscan (environmental awareness and challenges, Azariah Kiros, 2nd week)
Heart Beat (health and medical magazine, Gaby Katz, 3rd week)
The S-Files (the Sweden behind the headlines, Kris Boswell, 4th week)

FRIDAY
1205 R. Australia .... Sound Quality (Tim Ritchie seeks the interesting, the evolutionary, the inaccessible and the wonderful in music)
1245 R. Sweden .... A Report on the Nordic Newsweek (the week's main news stories)

SATURDAY
1200 WHRI(9840kHz) .... Dxing with Cumbre (Marie Lamb with the hottest DX catches)
1205 R. Australia .... The Music Show (Andrew Ford with music, interviews and latest developments in the music field)
R. Netherlands .... Wide Angle (one topic examined in-depth)
R. New Zealand Int. .. New Zealand Forces Program (continues from 1105)
1230 R. Sweden .... Weekend (a magazine about Europe from the Radio E consortium, 1st week)
Sweden Today (George Wood presents the voices of Sweden, 2nd week)
Spectrum (Bill Schiller covers the Swedish cultural scene, 3rd week)
Studio 49 (ideas and long-term trends in Nordic region,4th week)
WHRI Indiana .... DXing with Cumbre (Marie Lamb with the hottest DX catches)

1300 UTC/ 9am E/6am P - Page 49 Freqs

SUNDAY
1300 Channel Africa .... Channel Africa Extra (news, sports, music, regular reports and features)
1305 BBCWS(am) .... The Ticket (arts, culture and entertainment with live performances)
R. Australia .... The Science Show (one of the longest running programs on ABC Radio)
1310 R. Canada Int. .... The Sunday Edition (political, social and cultural matters, Michael Enright)
1320 China R. Int. .... In the Spotlight (Chinese arts and cultural magazine)
1330 R. Sweden .... In Touch with Stockholm (interactive listener program, Nidia Hagström, 1st weekend)
Sounds Nordic (youth music and trends magazine, Gaby Katz, every weekend but 1st)
WWCR(15825kHz) .. The Old Record Shop (vintage recordings)

MONDAY-FRIDAY
1305 BBCWS(am) .... Outlook (topical magazine of people, places and events)
R. Australia .... The Planet (Lucky Oceans, a/k/a Reuben Gosfield, worldwide mix of jazz, blues, folk styles, art music)
1310 R. Canada Int. .... Sounds Like Canada (a lively mix of voices and sound from all over the country)
1330 R. Sweden .... Sixty Degrees North (reports, interviews and analysis on the Nordic region)
1345 BBCWS(am) .... Off the Shelf (abridged serialized readings of novels, stories and other literature)

MONDAY
1330 China R. Int. .... People in the Know (interviews with prominent Chinese)
1345 R. Sweden .... Sports Scan (a weekly report on sports in the Nordic region)

TUESDAY
1330 China R. Int. .... Biz China (refer to T 0130)
1345 R. Sweden .... Close Up (profiles of people in Sweden from all walks of life)[1st/3rd T]

WEDNESDAY
1300 R. for Peace Int. .... World of Radio (refer to S 1200)

THURSDAY
1345 R. Sweden .... Nordic Lights (a monthly magazine on Scandinavia, 1st week)
Greenscan (Azariah Kiros, environmental awareness and challenges, 2nd week)
Heart Beat (Gaby Katz, health and medical magazine, 3rd week)
The S-Files (Kris Boswell, the Sweden behind the headlines, 4th week)

FRIDAY
1330 China R. Int. .... Life in China (the lives of ordinary people in China)
1345 R. Sweden .... A Report on the Nordic Newsweek (the week's main news stories)

SATURDAY
1300 Channel Africa .... Channel Africa Extra (variety show with news, sports, music, and features)
1305 BBCWS(am) .... Pick of the World (Daire Brehan with highlights from the past week's WS programs)
R. Australia .... The Music Show (cont'd from 1205)
1310 R. Canada Int. .... The House (a review of the week in Canadian national politics)
1330 R. for Peace Int. .... World of Radio (refer to S 1200)
R. Sweden .... Weekend (Europe from the Radio E consortium, first week)
Sweden Today (George Wood presents the voices of Sweden, second week)
Spectrum (Bill Schiller covers the Swedish cultural scene, third week)
Studio 49 (ideas and trends in the Nordic region, fourth week)
1345 BBCWS(am) .... Write On (Dilly Barlow and Penny Vine read your comments about the World Service)

1400 UTC/ 10am E/7am P - Page 49 Freqs

SUNDAY
1400 Channel Africa .... Channel Africa Extra (continued from 1300)
1405 BBCWS(am) .... Talking Point (live, global phone-in on issues with expert guests)
R. Australia .... Books and Writing (Ramona Koval, discussions on books, ideas and writing)
R. Canada Int. .... The Sunday Edition (continues from 1310, usually with a feature documentary)
1410 R. Japan .... Pop Joins the World (Asian countries through their popular music)
1420 China R. Int. .... In the Spotlight (Chinese arts and cultural magazine)
1435 R. Netherlands .... Wide Angle (one topic examined in-depth)
1455 R. Netherlands .... The Week Ahead (on RN the next seven days)

MONDAY-FRIDAY
1405 R. Australia .... Margaret Throsby (a guest is interviewed and presents favorite musical pieces)
R. Canada Int. .... Sounds Like Canada (continues from 1310)
1415 R. Japan .... 44 Minutes (current affairs magazine about Japan and Asia)
1430 R.Netherlands .... Newsline (news, analysis and background reports)

MONDAY
1405 BBCWS(am) .... Various documentary series
1430 BBCWS(am) .... The Music Feature (features and documentaries on current musical genres)
China R. Int. .... People in the Know (interviews with prominent Chinese who are shaping the nation's future)

TUESDAY
1405 BBCWS(am) .... Masterpiece (exploring major cultural ideas and great artistic endeavors)
1430 BBCWS(am) .... Top of the Pops (music from the British rock and pop charts)
China R. Int. .... Biz China (refer to T 0130)

WEDNESDAY
1405 BBCWS(am) .... Various documentary series
1430 BBCWS(am) .... Charlie Gillett (presents his selection of music from around the globe)

THURSDAY
1405 BBCWS(am) .... Assignment (BBC correspondents' investigative reports)
1430 BBCWS(am) .... The Music Biz (Mark Coles with a weekly look at the global music imdustry)

FRIDAY
1405 BBCWS(am) .... Sports International (the issues and personalities behind the headlines)
1430 BBCWS(am) .... John Peel (with his own unique and eclectic mix of new music)
China R. Int. .... Life in China (a weekly magazine focusing on the lives of ordinary people in China)

SATURDAY
1400 Channel Africa .... Channel Africa Extra (continued from 1300)
1405 BBCWS(am) .... Sportsworld (live commentary on major sports events, results from around the world)
R. Australia .... New Dimensions (conversations with leading thinkers and social innovators)
R. Canada Int. .... The Vinyl Cafe (Canadian humorist and storyteller Stuart McLean plays music and weaves tales)
1410 R. Japan .... Weekend Japanology (Japan through conversation and letters)
1435 R. Netherlands .... Europe Unzipped (the events of the past week in Europe, some unusual)
1455 R. Netherlands .... Insight (Rob Green casts a critical and humorous eye on the past week's headlines)

1500 UTC/ 11am E/8am P - Page 50 Freqs

DAILY
1530 R. Austria Int. .... Report from Austria (magazine on Austria and central and eastern Europe)

SUNDAY
1500 R. Netherlands .... Aural Tapestry (David Swatling weaves interesting stories using culture and history)
1505 BBCWS(am) .... Assignment (refer to H 1405)
R. Australia .... Encounter (acclaimed series on religion and life especially in multicultural Australia)
R. Canada Int. .... The Sunday Edition (continues from 1310)
1510 R. Japan .... Hello from Tokyo (refer to S 1110)
1530 BBCWS(am) .... People and Politics (the week in British politics)
R. Netherlands .... Dutch Horizons (Bertine Krol chronicles life in Holland)
1535 R. Austria Int. .... Network Europe (weekly magazine on Europe jointly produced by European broadcasters.)

MONDAY-FRIDAY
1505 R. Australia .... Asia-Pacific (current events and business report, Asia and Pacific)
1510 R. Japan .... Songs for Everyone
1515 R. Japan .... Asian Top News (the day's major stories as reported by the region's radio stations)

MONDAY
1500 R. Netherlands .... EuroQuest (a magazine placing Europe in context)
1505 BBCWS(am) .... Health Matters (reports on research explaining where medicine is going)
1525 R. Japan .... Japan Music Treasure Box (classic Japanese popular music)
1530 BBCWS(am) .... Panel game or quiz show
R. Australia .... The Health Report (Dr. Norman Swan's weekly report on health and medical issues)
R. Netherlands .... The Research File (a magazine emphasizing the relevance of science to all our lives)
1545 R. Canada Int. .... Out Front (new ideas, new ways of making radio and new voices from across Canada) ....

TUESDAY
1500 R. Netherlands .... A Good Life (how development affects societies)
1505 BBCWS(am) .... Go Digital (technology journalist Tracey Logan explains the latest in IT)
1525 R. Japan .... Basic Japanese for You (a language course for beginners)
1530 BBCWS(am) .... Music Review (music personalities, views and issues, Andrew Green)
R. Australia .... The Law Report (Damien Carrick, breaking legal stories)
R. Netherlands .... Music 52-15 (Hawley or Ohlenschlager, musical styles from around the globe)
1545 R. Canada Int. .... Out Front (refer to M 1545)

WEDNESDAY
1500 R. Netherlands .... Dutch Horizons (Bertine Krol chronicles life in Holland)
1505 BBCWS(am) .... Discovery (ideas and discoveries in science and technology)
1525 R. Japan .... Japan Musicscape (music and writings on a selected theme)
1530 BBCWS(am) .... Westway (the week's first episode of this soap)
R. Australia .... The Religion Report (Stephen Crittenden on how religion and societies interact)
R. Netherlands .... The Weekly Documentary (RN's award-winning sound essays and in-depth investigations)
1545 R. Canada Int. .... Out Front (refer to M 1545)

THURSDAY
1500 R. Netherlands .... The Research File (the relevance of science to all our lives)
1505 BBCWS(am) .... One Planet (stories about human impact on natural world)
1525 R. Japan .... Brush Up Your Japanese (an intermediate language course)
1530 BBCWS(am) .... The Word (Harriett Gilbert looks at the myriad world of writing)
[exc. last H] World Book Club (an author answers listener questions about a featured book)
R. Australia .... The Media Report (critical look at communications industries, Mick O'Regan)
R. Netherlands .... Aural Tapestry (David Swatling weaves interesting stories using culture and history)
1545 R. Canada Int. .... Out Front (refer to M 1545)

FRIDAY
1500 R. Netherlands .... The Weekly Documentary (award-winning sound essays and in-depth investigations)
1505 BBCWS(am) .... Science in Action (fascinating worlds of science and technology, Richard Black)
1525 R. Japan .... Music Beat (contemporary Japanese hits)
1530 BBCWS(am) .... Westway (the week's second episode of this soap)
R. Australia .... The Sports Factor (Warwick Hadfield debates the cultural significance of sport)
R. Canada Int. .... C'est La Vie (a program about life in Quebec and French-speaking Canada)
R. Netherlands .... A Good Life (how development affects societies)

SATURDAY
1500 R. Netherlands .... Amsterdam Forum (an interactive discussion of topical issues)
1505 BBCWS(am) .... Sportsworld (continues from 1405)
R. Australia .... Nocturne (a "beautifully woven tapestry of sound" presented by Robyn Johnston)
R. Canada Int. .... Quirks and Quarks (what's new and next in science)
R. Japan .... Hello from Tokyo (refer to S 1110)
1530 R. Netherlands .... Music 52-15 (Hawley or Ohlenschlager present musical styles from around the globe)

1600 UTC/ 12pm E/9am P - Page 50 Freqs

SUNDAY
1605 BBCWS(am) .... Sunday Sportsworld (live commentary on major sports events, results from around the world)
R. Australia .... The National Interest (Terry Lane's round-up of the week's major issues)
R. Netherlands .... Sincerely Yours (RN's listener response program)

MONDAY-FRIDAY
1600 BBCWS(am) .... Europe Today (news, analysis and comment on issues and events on the continent)
R. Netherlands .... Newsline (news, analysis and background reports)
1605 R. Australia .... Bush Telegraph (an entertaining look at rural and regional issues around Australia)
1630 BBCWS(am) .... World Business Report
1645 BBCWS(am) .... Sports Roundup (all the daily sporting news worldwide)

SATURDAY
1605 BBCWS(am) .... Sportsworld (continues from 1405)
R. Australia .... Nocturne (continues from 1505)
R. Netherlands .... Wide Angle (one topic examined in-depth)

1700 UTC/ 1pm E/10am P - Page 51 Freqs

DAILY
1700 R. Japan .... News (a round-up of Asian and world news)

SUNDAY
1705 R. Australia .... New Dimensions (an internationally syndicated program featuring interviews with leading thinkers and social innovators)
VOA Africa .... Reporters Roundtable (Ashenafi Abedje moderates lively panel with analysis of major news in Africa)
1710 R. Japan .... Pop Joins the World (refer to S 1410)
1730 VOA Africa .... Music Time in Africa (Rita Rochelle with best of traditional and modern African music)[broadcast in two editions with part two airing at 1930]

MONDAY-FRIDAY
1705 R. Australia .... Australia Talks Back (countrywide call-in on topical national issues)
VOA News Now .... Talk to America (Carol Pearson, worldwide call-in show with American decisionmakers, personalities and experts)
1710 R. Japan .... Songs for Everyone
1715 R. Japan .... 44 Minutes (current affairs magazine about Japan and Asia)

SATURDAY
1705 R. Australia .... The Spirit of Things (Dr. Rachael Kohn on contemporary values and beliefs expressed in ritual, art, music, and sacred texts)
VOA Africa .... Hip Hop Connections (Rod Murray, latest US hip hop music, interviews and information of interest to African youth)
1710 R. Japan .... Hello from Tokyo (refer to S 1110)

2100 UTC/ 5pm E/2pm P - Page 53 Freqs

SUNDAY
2100 WBCQ(7415kHz) .... Radio Free Euphoria (Captain Ganja's unique form of "variety" show)
WHRI(5745kHz) .... Dxing with Cumbre (Marie Lamb with the hottest DX catches)
2105 BBCWS(am) .... Various documentary series
Deutsche Welle .... Hard to Beat (the latest in sports from Germany and the world)
2110 R. Australia .... AM (ABC Radio's flagship morning news magazine)
2115 Deutsche Welle .... Inspired Minds (profiles of and interviews with creative and industrious people)
2130 BBCWS(am) .... In Praise of God (services of worship from around the UK)
Deutsche Welle .... Hits in Germany (with Deborah Friedman)[fortnightly]
Melody Time (light classical favorites with Diane Erickson) [fortnightly]
R. Australia .... Country Breakfast (Australia beyond the urban fringe)

MONDAY-FRIDAY
2105 Deutsche Welle .... Newslink Africa (world events with emphasis on the way they affect Africa)
2130 BBCWS(am) .... World Business Report

MONDAY
2100 WBCQ(7415kHz) .... Jean Shepherd (the noted humorist's classic radio programs from the 60s and 70s)
2110 R. Australia .... AM (ABC Radio's flagship morning news magazine)

2130 Deutsche Welle .... World Music Live
R. Australia .... Rural Reporter (news and stories from rural and regional Australia)
2145 BBCWS(am) .... Analysis (background to the stories in the news)

TUESDAY
2110 R. Australia .... AM (ABC Radio's flagship morning news magazine)
2130 Deutsche Welle .... Arts on the Air (an award-winning weekly cultural magazine)
R. Australia .... Innovations (showcasing Australian invention, enterprise and ingenuity)
2145 BBCWS(am) .... Analysis (background to the stories in the news)

WEDNESDAY
2110 R. Australia .... AM (ABC Radio's flagship morning news magazine)
2130 Deutsche Welle .... Living in Germany (aspects of life in Germany)
R. Australia .... Educational series
2145 BBCWS(am) .... From Our Own Correspondent (the background to international events)
Deutsche Welle .... Europe on Stage

THURSDAY
2110 R. Australia .... AM (ABC Radio's flagship morning news magazine)
2130 Deutsche Welle .... Cool! (the latest in youth culture in Germany and abroad)
R. Australia .... All in the Mind (refer to A 2305)
2145 BBCWS(am) .... Analysis (background to the stories in the news)

FRIDAY
2100 WBCQ(7415kHz) .... Juliet's Wild Kingdom
WHRA(17650kHz) .... Dxing with Cumbre (Marie Lamb with the hottest DX catches)
2105 R. Australia .... Feedback (Roger Broadbent answers and updates about RA)
2130 Deutsche Welle .... Focus on Folk (Angelika Ditscheid with real German folk music, sources and performers)
R. Australia .... Oz Sounds (Australian new music releases)
2130 WBCQ(7415kHz) .... Pab Sungenis Project (stand-up comedy and sketches)
2145 BBCWS(am) .... Analysis (background to the stories in the news)

SATURDAY
2100 BBCWS(am) .... Play of the Week (classic and contemporary drama for radio)
WBCQ(7415kHz) .... HarvZower (a personal selection of contemporary music)
2105 Deutsche Welle .... Religion and Society (insight into religious events throughout the world)
R. Australia .... Australia All Over (Ian McNamara—aka "Macca"—celebration of Australiana)
2115 Deutsche Welle .... German by Radio (a weekly language lesson)
2130 Deutsche Welle .... Africa This Week (comprehensive look at Africa, Carla Gehrmann-Zellen)
WHRA(17650kHz) .... Dxing with Cumbre (Marie Lamb with the hottest DX catches)
2145 R. Australia .... Asia Sunday (a roundup of the week's news from Asia)

2200 UTC/ 6pm E/3pm P - Page 54 Freqs

DAILY
2200 BBCWS(am) .... The World Today (the BBC's flagship global news program)

SUNDAY
2200 R. Canada Int. .... The World This Weekend (CBC weekend news magazine)
2210 R. Australia .... AM (ABC Radio's flagship morning news magazine)
2230 R. Canada Int. .... The Inside Track (anthologies and documentaries about sports)
R. Vlaanderen Int. .... Radio World (Frans Vossen presents a weekly report about international radio)
2240 R. Australia .... Australia Wide (a roundup of "home" news from ABC Newsradio)

MONDAY-FRIDAY
2200 R. Canada Int. .... The World at Six (the CBC's flagship evening newscast)
2230 R. Canada Int. .... As It Happens (Barbara Budd and Mary Lou Finley interview newsmakers and eyewitnesses)

MONDAY
R. Australia .... AM (ABC Radio's flagship morning news magazine)
2240 R. Australia .... Australia Wide (refer to S 2240)

TUESDAY
2210 R. Australia .... AM (ABC Radio's flagship morning news magazine)
2240 R. Australia .... Australia Wide (refer to S 2240)

WEDNESDAY
2210 R. Australia .... AM (ABC Radio's flagship morning news magazine)
2240 R. Australia .... Australia Wide (refer to S 2240)

THURSDAY
2210 R. Australia .... AM (ABC Radio's flagship morning news magazine)
2230 WBCQ(7415kHz) .... Uncle Ed's Musical Memories
2240 R. Australia .... Australia Wide (refer to S 2240)

FRIDAY
2205 R. Australia .... Asia-Pacific Weekend Edition (regional news and business report)
2230 R. Australia .... AM Saturday (ABC Radio's weekend morning news magazine)
WBCQ(7415kHz) .... Wanton Display of Control and Disruption

SATURDAY
2200 R. Canada Int. .... The World This Weekend (CBC weekend news magazine)
WBCQ(7415kHz) .... Radio Timtron Worldwide
2205 R. Australia .... Correspondents Report (interpretation and analysis of the week's major events)
2230 BBCWS(am) .... Agenda (ideas and trends shaping our world)
R. Australia .... The Business Report (round-up of the latest business news, Narelle Hooper)
R. Canada Int. .... Madly Off in All Directions (satire and comedy)
R. Vlaanderen Int. .... Music from Flanders (Flemish music, musicians and performances, 1/2 hr)
WHRI(9495kHz) .... Dxing with Cumbre (Marie Lamb with the hottest DX catches)

2300 UTC/ 7pm E/4pm P - Page 54 Freqs

SUNDAY
2300 WBCQ(7415kHz) .... Le Show (Harry Shearer with a tour-de-force variety show)
2305 BBCWS(am) .... Various documentary series
R. Canada Int. .... Global Village (Jowi Taylor fields reports and music from global venues)
2310 R. Australia .... Asia-Pacific (current events and business report, Asia and Pacific)
2320 China R. Int. .... In the Spotlight (Chinese arts and cultural magazine)
2330 BBCWS(am) .... Panel game or quiz show
R. Australia .... The Business Report (refer to A 2230)
2330 WHRI(5745kHz.) ...... Dxing with Cumbre (Marie Lamb with the hottest DX catches)
2335 R. Netherlands .... Sincerely Yours (RN's listener response program)
2355 R. Netherlands .... The Week Ahead (on RN the next seven days)

MONDAY-FRIDAY
2305 BBCWS(am) .... Outlook (topical magazine of people, places and events)
2305 R. Canada Int. .... As It Happens (continues from 2230)
2330 R. Netherlands .... Newsline (news, analysis and background reports)
2345 BBCWS(am) .... Off the Shelf (serialized book readings)

MONDAY
2310 R. Australia .... Asia-Pacific (current events and business report, Asia and Pacific)
2330 China R. Int. .... People in the Know (interviews with prominent Chinese)
R. Australia .... The Europeans (political, cultural, economic and social developments)

TUESDAY
2310 R. Australia .... Asia-Pacific (current events and business report, Asia and Pacific)
2330 China R. Int. .... Biz China (refer to T 0130)
R. Australia .... Earthbeat (Alexandra deBlas, diverse and dynamic environment program)

WEDNESDAY
2310 R. Australia .... Asia-Pacific (current events and business report, Asia and Pacific)
2330 R. Australia .... The Arts on RA (an arts-related interview and film review)
R. Canada Int. .... Dispatches (Canadian perspective on international news topics)

THURSDAY
2310 R. Australia .... Asia-Pacific (current events and business report, Asia and Pacific)
2330 R. Australia .... The Buzz (the week's big technology news and issues, Richard Aedy)

FRIDAY
2300 WBCQ(7415kHz) .... The Lost Discs Radio Show (spinning obscure oldies and "B" sides from 1955-70)
2305 R. Australia .... Country Breakfast (Australia beyond the urban fringe)
2330 China R. Int. .... Life in China (a weekly magazine focusing on the lives of ordinary people in China)
R. Australia .... Lingua Franca (language and its social, cultural and historical ramifications)
2345 BBCWS(am) .... Westway (drama serial)

SATURDAY
2300 WBCQ(7415kHz) .... The Real Amateur Radio Show
2305 BBCWS(am) .... Pick of the World (Daire Brehan with highlights from the past week's WS programs)
R. Australia .... All in the Mind (the mind, brain and behavior, Natasha Mitchell)
2305 R. Canada Int. .... Quirks and Quarks (what's new and next in science)
2330 R. Australia .... Innovations (showcasing Australian invention, enterprise and ingenuity)
WBCQ(7415kHz) .... Fred Flintstone's Music Show
2335 R. Netherlands .... Europe Unzipped (the events of the past week in Europe, some unusual)
2335 R. Netherlands .... Insight (Rob Green casts a critical and humorous eye on the past week's headlines)
2345 BBCWS(am) .... Write On (Dilly Barlow and Penny Vine read your comments, questions and criticisms)

Thank You ...

Additional Contributors to This Month's Shortwave Guide:

Mike Barraclough, Letchworth, UK; Harold Frodge, Midland, MI; Jose Jacob VU2JOS, India; Andy Sennitt/Radio Netherlands; Alokesh Gupta; Swopan Chakroborty, New Delhi, India; Glenn Hauser, Enid, OK; E. Michael Murray, UK; Doni Rosenziweig, Israel; Adrian Sainsbury, R. NZ Intl; Harold Sellers, Robert Thomas, Bridgeport, CT; Larry Van Horn, MT Asst. Editor; *BBC On Air; BCL News; BCDXC; Cumbre DX; DXA; DX Listening Digest; DX News; ODXA/DX Ontario; Fineware; Hard Core DX ; HFCC; NASWA; NASWA Flash Sheet; Observer; World of Radio; Worldwide DX Club.*

MILCOM
MONITORING MILITARY COMMUNICATIONS

Larry Van Horn
larryvanhorn@monitoringtimes.com

Aerial Refueling Tracks

It is sometimes called by non-military observers as “a ballet of the skies.” And it is one of the more fascinating flight operations conducted by U.S. military aircraft. This aerial dance of aircraft exchanging fuel inflight is exciting to watch and can be just as exciting to monitor on your scanner. This operation is the aerial inflight refueling mission.

Inflight aircraft refueling operations are normally conducted in designated tracks (straight-line vectors) or anchor areas (air spaces) assigned to specific military units. Most are assigned to the Air Force, but the Navy and the Army also have a few. The tanker aircraft is responsible for keeping the operation within the track or anchor unless clearance is granted.

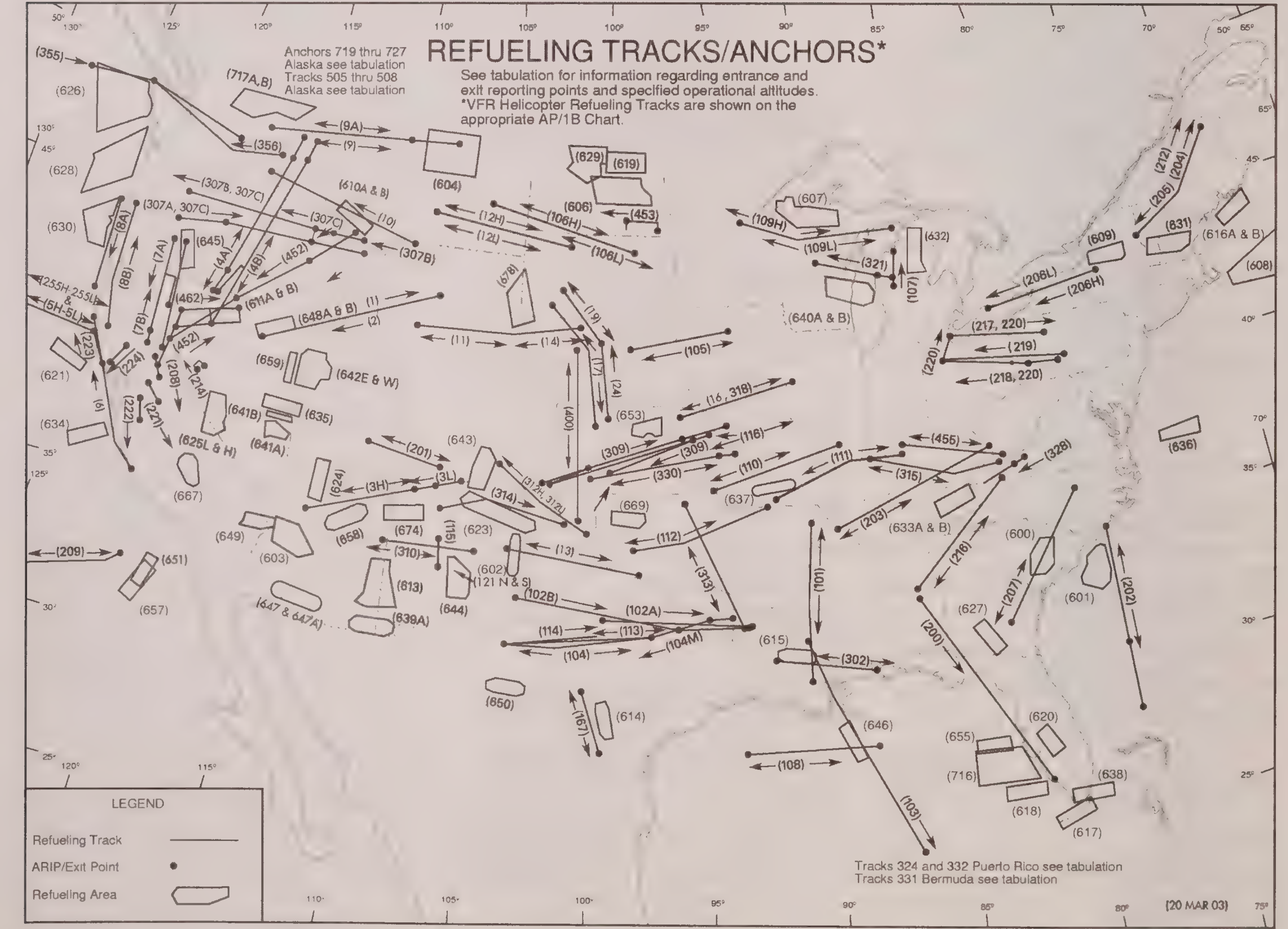
On a refueling track, the receiver aircraft initiates a rendezvous with the tanker, then it descends to the refueling altitude after passing the Air Refueling Initial Point (ARIP). The tanker will orbit at the Air Refueling Control Point (ARCP), awaiting the receiver aircraft. All refueling is done under Instrument Flight Rules (IFR). A track will have checkpoints to provide adequate navigation for refueling aircraft, and to depart from the track after refueling.

A refueling anchor is a left-hand race-track pattern surrounding a geographical point, with legs separated by a minimum of 20 miles, and with a minimum leg length of 50 miles. There are specified entry and exit points for the aircraft.

Air Route Traffic Control Center (ARTCC) frequencies – civilian “center” frequencies – are used at the entry and exit points. Each track/anchor has primary and secondary military UHF frequencies; these are the most active. All these refueling frequencies are listed under the installation that controls them. Each track/anchor has its own designator, like “AR-215 primary.” Often one base controls several ARs and they will usually have the same secondary frequency.

❖ Tracks and Anchor Frequencies

The following is a comprehensive list of aerial refueling tracks and anchors, frequencies, and scheduling units set up in the continental United States, Puerto Rico, Bermuda, Alaska and Hawaii. The listing will be continued over the next several editions of *Milcom.*



REFUELING TRACKS/ANCHORS*

See tabulation for information regarding entrance and exit reporting points and specified operational altitudes.
*VFR Helicopter Refueling Tracks are shown on the appropriate AP/1B Chart.

Anchors 719 thru 727 Alaska see tabulation
Tracks 505 thru 508 Alaska see tabulation

Tracks 324 and 332 Puerto Rico see tabulation
Tracks 331 Bermuda see tabulation

(20 MAR 03)

LEGEND
Refueling Track
ARIP/Exit Point
Refueling Area
130°
125°
120°
115°
110°
105°
100°
95°
90°
85°
80°
75°
70°
65°
50°
45°
40°
35°
30°
25°
(355)
(626)
(628)
(630)
(621)
(634)
(717A,B)
(356)
(9A)
(9)
(604)
(629)
(619)
(606)
(453)
(106H)
(106L)
(12H)
(12L)
(307B, 307C)
(307A, 307C)
(307C)
(307B)
(610A & B)
(10)
(8A)
(8B)
(7A)
(7B)
(645)
(4A)
(4B)
(452)
(462)
(611A & B)
(648A & B)
(1)
(2)
(255H, 255L & 5H-5L)
(223)
(224)
(208)
(214)
(6)
(222)
(221)
(625L & H)
(667)
(641B)
(641A)
(635)
(659)
(642E & W)
(678)
(11)
(14)
(19)
(17)
(24)
(400)
(105)
(653)
(16, 318)
(116)
(309)
(330)
(110)
(111)
(455)
(315)
(328)
(636)
(607)
(109H)
(109L)
(321)
(632)
(107)
(640A & B)
(609)
(631)
(616A & B)
(608)
(212)
(204)
(205)
(206L)
(206H)
(217, 220)
(219)
(218, 220)
(220)
(201)
(643)
(3L)
(3H)
(624)
(314)
(312H, 312L)
(669)
(637)
(203)
(633A & B)
(112)
(313)
(101)
(216)
(600)
(207)
(627)
(601)
(202)
(649)
(603)
(658)
(674)
(310)
(115)
(623)
(13)
(602)
(121 N & S)
(613)
(644)
(102B)
(102A)
(113)
(114)
(104M)
(104)
(615)
(302)
(200)
(647 & 647A)
(639A)
(209)
(651)
(657)
(650)
(167)
(614)
(646)
(108)
(103)
(620)
(655)
(716)
(618)
(638)
(617)

Aerial Refueling Tracks

Track	Refueling			ARTCC		Assigned
	Primary	Secondary	ARCP	Exit	ARTCC	Scheduling Unit
AR-1E	343.50	319.50	397.90	263.10	Salt Lake City	60OSS Travis AFB
AR-2W	283.90	319.50	323.00	363.15	Salt Lake City	60OSS Travis AFB
AR-3H E	344.70	339.20	386.80	290.40	Los Angeles/Denver	60OSS Travis AFB
			Note: ARIP – 323.20 Denver, Point – 386.80			
AR-3H W	344.70	339.20	386.80	323.20	Los Angeles/Denver	60OSS Travis AFB
			Note: ARIP – 290.40 Denver, Point – 386.80			
AR-3L	235.10	319.50	343.70	343.70	Denver	151ARW Salt Lake City
AR-4A N	344.70	292.60	290.50	251.10	Seattle	366OSS Mt. Home AFB
AR-4A S	344.70	292.60	251.10	290.50	Seattle	366OSS Mt. Home AFB
AR-4B N	235.10	292.60	290.50	251.10	Seattle	366OSS Mt. Home AFB
AR-4B S	235.10	292.60	251.10	290.50	Seattle	366OSS Mt. Home AFB
AR-5H E/W	283.90	319.50	306.20	133.375	Oakland	60OSS Travis AFB
AR-5L E/W	366.30	319.50	387.10	134.150	Oakland	60OSS Travis AFB
AR-6	352.60	319.50	290.50	290.30	Oakland	60OSS Travis AFB
AR-7A	276.50	319.50	327.10	269.10	Oakland/Seattle	60OSS Travis AFB
AR-7B	295.40	319.50	269.10	327.10	Seattle/Oakland	60OSS Travis AFB
AR-8A	295.80	319.50	360.70	360.70	Seattle	60OSS Travis AFB
AR-8B	305.50	319.50	360.70	279.60	Seattle	60OSS Travis AFB
AR-9E	238.90	292.60	251.10	269.40	Salt Lake City	120FW Great Falls
AR-9W	238.90	292.60	317.60	251.10	Salt Lake City	120FW Great Falls
AR-9A E	238.90	292.60	251.10	269.40	Salt Lake City	120FW Great Falls
AR-9A W	238.90	292.60	317.60	251.10	Salt Lake City	120FW Great Falls
AR-10NW	366.30	292.60	338.30	251.10	Seattle/Salt Lake City	62OSS McChord AFB
AR-10SE	366.30	292.60	251.10	263.10	Salt Lake City/Seattle	62OSS McChord AFB
AR-11E	235.10	320.90	385.60	338.20	Denver	28OSS Ellsworth AFB
AR-11W	235.10	320.90	338.20	353.50	Salt Lake City/Denver	28OSS Ellsworth AFB
AR-12H E	352.60	320.90	272.75	317.50	Minneapolis/Salt Lake City	28OSS Ellsworth AFB
AR-12H W	352.60	320.90	272.75	351.90	Salt Lake City	28OSS Ellsworth AFB
AR-12L E	344.70	292.60	272.75	263.00	Minneapolis/Salt Lake City	28OSS Ellsworth AFB
AR-12L W	344.70	292.60	272.75	351.90	Salt Lake City	28OSS Ellsworth AFB
AR-13E	238.90	260.20	381.60	285.60	Fort Worth	2OSS Barksdale AFB
AR-13W	238.90	260.20	285.60	251.10	Fort Worth	2OSS Barksdale AFB
AR-14E	336.10	359.10	239.00	269.60	Denver	28OSS Ellsworth AFB
AR-14W	336.10	359.10	338.20	291.60	Salt Lake City/Denver	28OSS Ellsworth AFB
AR-16E	343.50	319.70	343.70	353.50	Chicago/Kansas City	1ACCS Offutt AFB
AR-16W	343.50	319.70	370.90	343.70	Kansas City	1ACCS Offutt AFB
AR-17N	276.50	320.90	353.70	338.20	Denver	28OSS Ellsworth AFB
AR-17S	276.50	320.90	338.20	353.70	Denver	28OSS Ellsworth AFB
AR-19N	295.40	320.90	360.65	322.50	Denver	28OSS Ellsworth AFB
AR-19S	295.40	320.90	322.50	360.65	Denver	28OSS Ellsworth AFB
AR-20NE	341.75	349.70	269.30/133.45	Boston		
			368.50/123.90	Moncton	437OSS Charleston AFB	
AR-20SW	341.75	349.70	294.50/133.90	Gander	437OSS Charleston AFB	
			247.0/133.550	Gander (westbound)		
			266.30/118.60	Moncton (eastbound)		
AR-24N/S	295.40	320.90	338.20	353.70	Denver	28OSS Ellsworth AFB
AR-101N	324.60	260.20	269.50	306.90	Memphis	2OSS Barksdale AFB
			133.65	120.85	Memphis	
AR-101S	324.60	260.20	335.50	269.50	Memphis	2OSS Barksdale AFB
			123.75	133.65	Memphis	
			Note: ARIP – 306.90/120.850 Memphis at selected times			
AR-102A E	276.50	260.20	323.00	327.80	Fort Worth	2OSS Barksdale AFB
AR-102B	276.50	260.20	327.10	327.80	Fort Worth	2OSS Barksdale AFB
			133.35	Fort Worth		
AR-103	327.600	260.20	Houston	55 Wing Offutt AFB		
	Note: AR-103 reserved for Offutt based aircraft and tankers only					
AR-104E	344.70	260.20	269.00	269.00	Fort Worth	2OSS Barksdale AFB
AR-104W	344.70	260.20	351.90	351.90	Fort Worth	2OSS Barksdale AFB
AR-104M	344.70	260.20	322.45	Fort Worth	2OSS Barksdale AFB	
	Note: AR-104M restricted use to Flight Training Unit B-52 aircraft and support tankers only					
AR-105E/W	238.90	320.90	269.00	269.00	Minneapolis	55 Wing Offutt AFB
	Note: On AR-105 East/West, 55 SRW aircraft have priority this route.					
AR-106H E	295.80	320.90	269.40	306.20	Minneapolis	5BMW Minot AFB
AR-106H W	295.80	320.90	306.20	269.40	Minneapolis	5BMW Minot AFB
AR-106L E	305.50	320.90	269.40	306.20	Minneapolis	55 Wing Offutt AFB
AR-106L W	305.50	320.90	306.20	269.40	Minneapolis	55 Wing Offutt AFB
AR-107	324.60	282.70	353.60	353.60	Minneapolis	110FW Battle Creek
AR-108E	348.90	260.20	132.650 (KC10)	Houston	2OSS Barksdale AFB	
			306.30	269.50	Houston	
			133.40	133.85	Houston	
AR-108W	348.90	260.20	132.650 (KC10)	Houston	2OSS Barksdale AFB	
			269.50	306.30	Houston	
			133.85	133.40	Houston	
AR-109H E/W	343.50	320.90	327.10	327.10	Minneapolis	55 Wing Offutt AFB
AR-109L E/W	327.60	320.90	327.10	327.10	Minneapolis	55 Wing Offutt AFB
AR-110E	327.60	319.70	277.40	346.40	Kansas City	509OSS Whiteman AFB
AR-110W	327.60	319.70	319.00	277.40	Kansas City	509OSS Whiteman AFB
AR-111E	348.90	319.70	257.60	285.50	Memphis	552OSS Tinker AFB
AR-111W	348.90	319.70	285.50	257.60	Memphis	552OSS Tinker AFB
	Note: AR-111 East/West Restricted to 552 ACW aircraft and support tankers					
AR-112E	235.10	260.20	363.10	353.80	Fort Worth	VQ-3 Tinker AFB
AR-112W	235.10	260.20	353.80	363.10	Fort Worth	VQ-3 Tinker AFB
AR-113E	283.90	260.30	360.80	353.70	Fort Worth	7OSS Dyess AFB
AR-113W	283.90	260.30	269.40	343.60	Albuquerque/Fort Worth	7OSS Dyess AFB
	Note: Intended for use by B-1 aircraft and support tankers					
AR-114	366.30	260.20	360.80	343.60	Albuquerque/Fort Worth	7OSS Dyess AFB
	Note: Intended for use by B-1 aircraft and support tankers for training requirements					
AR-115	58 SOW assign	307.20	307.20	Albuquerque	58SOW Kirtland AFB	
			128.80	128.80	Albuquerque	

(Continued next month)

TRACKING THE TRUNKS

TECHNOLOGY, EQUIPMENT, FREQUENCIES AND NEWS

Dan Veeneman
danveeneman@monitoringtimes.com
http://www.signalharbor.com

Sorting Out Talkgroups in LA

When you boil it down, besides the proper scanner, success in monitoring trunked radio systems requires information about radio frequencies and talk groups. Frequency listings can be found in many places, including the official database of the Federal Communications Commission (FCC). However, finding talkgroup information is more of a challenge, and even when you do find a list, what if it doesn't match up with what you're seeing?

❖ Los Angeles, California

> *I recently bought a Radio Shack PRO-95 1,000-channel scanner, and it's working quite well. However, I have a question related to trunking. I'll try to be as succinct as possible: I programmed 20 trunked Los Angeles city frequencies (EDACS) into one of the banks. The PRO-95 is so far scanning and tracking them flawlessly, but I'm confused by the talk group ID numbers. The numbers that the scanner displays, such as 0179 or 2450, don't appear to match any of the talk group ID numbers listed in my 2003 edition of POLICE CALL.*
>
> *What gives? Do they change the ID numbers all the time? Are there far more ID numbers in a given system than are listed in POLICE CALL? Am I missing a step? Please let me know.*
>
> *-Chris in Redondo Beach, California*

The city and the county of Los Angeles both operate EDACS (Enhanced Digital Access Communication System) trunked radio networks. Talkgroups in EDACS systems are made up of three parts: Agency, Fleet and Sub-fleet, which are abbreviated as AFS. An Agency may have many Fleets, while each Fleet may have numerous Sub-fleets. AFS is usually shown in the format AA-FFS where AA is the Agency, FF is the Fleet and S is the Sub-fleet. Much more information about EDACS can be found in my April 2000 *Tracking the Trunks* column.

Newer trunk-tracking scanners that support EDACS default to displaying talkgroups in AFS format rather than a simple decimal number. However, based on your letter, it appears your PRO-95 may be showing talkgroups in decimal, rather than AFS, format.

ID numbers typically don't change that often, but you need to keep in mind the source of talkgroup information. In general, almost all of the lists you read come from scanner listeners like yourself, since very few public safety agencies are forward-thinking enough to release their talkgroup organizational charts. What this means is that published information is almost always incomplete and reflects only what listeners have been able to work out. You may be hearing traffic in talkgroups that others have not managed to catch or figure out and publish. Also, in the case of such a large network as Los Angeles, system operators may occasionally move talkgroups from one system to another, causing existing talkgroup lists to immediately become out-of-date.

In any case, after listening to the traffic on a particular talkgroup for a while, you should be able to figure out which city or county department is using it, and will soon develop your own talkgroup listing. Of course, please send in whatever results you obtain!

For those wishing to scan EDACS traffic, recall that the frequencies must be entered in Logical Channel Number (LCN) order or trunk tracking will not operate correctly. In the following frequency listings there are some gaps – leave the slot empty as you're programming your scanner so that all of the frequencies are kept in the proper sequence.

The L.A. County network actually has three distinct systems.

System A frequencies, in LCN order:

01	866.0625
02	866.4375
03	blank
04	blank
05	blank
06	867.9375
07	blank
08	blank
09	blank
10	blank
11	867.4375
12	867.7500
13	blank
14	blank
15	868.4375
16	868.5875
17	blank
18	blank
19	blank
20	868.3000

System B operates on the following frequencies, in LCN order: 866.0875, 866.5875, 866.9375, 867.2250, 867.7250, 866.2500, 866.7750, 867.7750, 868.0875, 868.7750, 868.7250, 866.3000, 866.2750, 866.8000, 867.2750, 867.8000, 868.2750, 868.8000, 867.2500 and 868.2500 MHz.

System C uses 866.2250, 866.7250, 867.3000, 868.2250 and 868.7500 MHz.

The following is a list of some of the County talkgroups. The first column contains the talk group in decimal form. The second column is the same talk group, but in AFS format.

1057	08-041	Animal Control 1
1058	08-042	Animal Control 2
1169	09-021	Coroner 1
1170	09-022	Coroner 2
1171	09-023	Coroner 3
1185	09-041	District Attorney Dispatch
1186	09-042	District Attorney Tactical 1
1187	09-043	District Attorney Tactical 2
1125	08-125	Public Works Emergency Management
1126	08-126	Fire Emergency Management
1129	08-131	Sheriff Emergency Management
1130	08-132	Los Angeles City Emergency Management
1132	08-134	Emergency Operations Center
1133	08-135	Emergency Operations Center (All)
1233	09-101	Flood Control Dispatch
1234	09-102	Flood Control (East)
1235	09-103	Flood Control (West)
1236	09-104	Flood Control (South)
1356	10-094	Safety Police (Common)
1425	11-021	Parks Dispatch (North)
1426	11-022	Parks Dispatch (East)
1427	11-023	Parks Dispatch (South)
1428	11-024	Parks Tactical 1
1429	11-025	Parks Tactical 2
1217	09-081	Public Works Administration
1218	09-082	Public Works Survey
1219	09-083	Public Works Construction
1249	09-121	Road Maintenance Dispatch
1250	09-122	Road Maintenance 1
1251	09-123	Road Maintenance 2
1252	09-124	Road Maintenance 3
1253	09-125	Road Maintenance 4
1254	09-126	Road Maintenance 5
1265	09-141	Water Works Dispatcher
1266	09-142	Water Works (South)
1267	09-143	Water Works (North)
1268	09-144	Sewer Maintenance (South)
1269	09-145	Sewer Maintenance (Control)
1270	09-146	Sewer Maintenance (East)
1271	09-147	Sewer Maintenance (South)
1272	09-150	Water Works/Sewer Maintenance Emergency

The Los Angeles City network has two linked EDACS systems. The frequencies I have are listed as follows:

System 2

01	866.1125
02	866.1375
03	866.3875
04	866.4125
05	blank (maybe 866.6125?)
06	866.6375
07	866.8875
08	866.9125
09	867.1125

10	867.1375
11	867.3875
12	867.4125
13	867.6125
14	867.6375
15	867.8875
16	867.9125
17	868.1125
18	868.1375
19	868.3875
20	868.4125

System 3

01	866.1875
02	blank (maybe 866.3375?)
03	866.3625
04	866.6875
05	866.8375
06	866.8625
07	867.1875
08	blank (maybe 867.3375?)
09	867.3625
10	867.6875
11	867.8625
12	868.1875
13	868.3375
14	blank (maybe 868.3625?)
15	blank (maybe 868.6875?)
16	866.1625
17	866.6625
18	867.1625
19	867.6625
20	868.1625

L.A. City talkgroups include the following:

33	00-041	Animal Control 1
34	00-042	Animal Control 2
35	00-043	Animal Control 3
36	00-044	Animal Control 4
65	00-081	Building and Safety 1
66	00-082	Building and Safety 2
67	00-083	Building and Safety 3
68	00-084	Building and Safety 4
69	00-085	Building and Safety Emergency Mgmt
161	01-041	Department of Transportation Administration
164	01-044	Department of Transportation (Central)
167	01-047	Department of Transportation (Southern)
168	01-050	Department of Transportation (Western)
169	01-051	Department of Transportation (Valley)
170	01-052	Department of Transportation Engineering
172	01-054	Department of Transportation Investigation
257	02-001	Harbor Director
258	02-002	Harbor Security
266	02-012	Harbor Dispatch
267	02-013	Harbor Tactical 1
268	02-014	Harbor Tactical 2
289	02-041	Housing Authority
449	03-081	Public Works (Central 1)
450	03-082	Public Works (Central 2)
451	03-083	Public Works (Central 3)
452	03-084	Public Works (Valley 1)
453	03-085	Public Works (Valley 2)
577	04-081	Parks and Recreation Base
578	04-082	Parks and Recreation Administration
579	04-083	Parks and Recreation Ranger
580	04-084	Parks and Recreation Rangers 1
581	04-085	Parks and Recreation Rangers 2
586	04-092	Parks and Recreation Zoo

❖ Flagstaff, Arizona

Just wanted to say I enjoy your column. I live in Flagstaff, Arizona. Radio listening is my hobby, mainly shortwave and police scanning. I am disabled so the hobby keeps me busy. Flagstaff switched to an 800 MHz trunk system and in talking to my local police I found out they have an 11-channel system which they share with NAU University. Most frequency directories list the NAU system but don't list Flagstaff, and they only list five of the eleven frequencies. Keep up the good work, I look forward to your column each month.
- Rich

Northern Arizona University (NAU) operates a Motorola Type II system that is shared by the city of Flagstaff in Coconino County. The Federal Communications Commission (FCC) frequency database lists six frequencies: 855.2125, 856.2125, 857.2125, 857.9875, 858.9875 and 859.4375 MHz. I'm not sure what the other five frequencies would be, since they're not listed in the official FCC database along with the known Flagstaff and NAU license assignments. I do have the following talkgroups on the system:

9712	25F	Flagstaff Police Records
9936	26D	Flagstaff Police Dispatch
1616	065	NAU Police Dispatch
1648	067	NAU Police - B - Alternate
1680	069	NAU Police - C - Alternate
1712	06B	NAU Police - D - Alternate
3216	0C9	Parking
6448	193	Maintenance
6544	199	NAU General Services

If anyone is aware of the any additional frequencies or talkgroups, please let me know via electronic mail!

❖ Johnson County, Indiana

Johnson County, Indiana, just to the south of Indianapolis, began operating an 800 MHz digital system in January 2002 as a demonstration effort for Indiana's emerging statewide radio network called Project Hoosier SAFE-T (Safety Acting For Everyone - Together). Planning for SAFE-T began in 1997 with the goal of allowing separate federal, state and local agencies to communicate with each other. This shared system would replace older, overloaded systems as well as provide better coverage throughout the state.

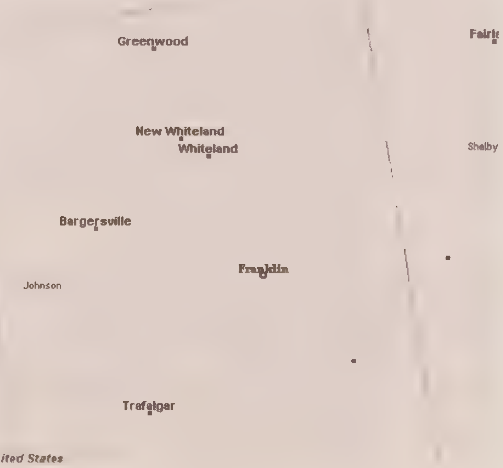
SAFE-T is a Motorola ASTRO mixed analog and digital network. Using repeater sites in Franklin, Greenwood and Mooresville, the Johnson County system is now providing better and more reliable coverage for a dozen police departments and six fire departments on the following frequencies: 855.7125, 866.4750, 867.0375, 867.3750, 867.4750, 867.9000, 868.3750, 868.4500, 868.9000 and 868.9750 MHz.

Crawfordsville, in Montgomery County, joined the SAFE-T network last year. Frequencies in use in Montgomery County are 866.4875, 866.8875, 867.4125, 867.9375, 868.4625, 868.7625 and 868.9875 MHz.

Some of the known talkgroups on the SAFE-T network:

48	003	Johnson County Emergency Management
64	004	Johnson County Animal Control
80	005	Johnson County Jail
128	008	Johnson County Investigations
160	00A	Johnson County Administration
176	00B	Johnson County Emergency Medical Service
192	00C	Johnson County Fire
208	00D	Johnson County Fireground 1
224	00E	Johnson County Fireground 2
240	00F	Johnson County Fireground 3
256	010	Johnson County Fireground 4
272	011	Johnson County Fireground 5
288	012	Johnson County Fireground 6
304	013	Amity Fire Admin
320	014	Nineveh Fire Admin
336	015	Trafalgar Fire Admin
352	016	Whiteland Fire Admin
368	017	Needham Fire Admin
384	018	Clark Fire Admin
400	019	White River Township Fire Admin
432	01B	Johnson County Fire Dispatch
448	01C	Greenwood Fireground
528	021	Greenwood Fire Dispatch
560	023	New Whiteland Fire
608	026	Franklin City Emergency Medical Service
688	02B	Franklin City Fire Dispatch
752	02F	Edinburgh City Fire Dispatch
816	033	Bargersville Fire Dispatch
7456	1D2	Crawfordsville Police
7664	1DF	Franklin City Police Car to Car 1
7680	1E0	Franklin City Police Dispatch
7728	1E3	New Whiteland Police Dispatch
7792	1E7	Greenwood Police (East)
7808	1E8	Greenwood Police (West)
7824	1E9	Greenwood Police Dispatch (East)
7840	1EA	Greenwood Police Dispatch (West)
8000	1F4	Johnson County Sheriff Dispatch
28512	6F6	Indiana State Police District 42 Dispatch

That's all I have space for this month. Please e-mail me with any questions, comments or updates at *danveeneman @ monitoringtimes.com.* You can always find more information, frequencies and links on my web site at **http://www.signalharbor.com**. Until next month, happy monitoring!



National Atlas of the United States

PLANE TALK

Jean Baker

jeanbaker@monitoringtimes.com

Recording Cockpit Voices and Flight Data

Welcome aboard! We have some very educational subjects today, so let's get started! Many thanks to the NTSB (National Transportation Safety Board) for their informative website at **http://www.ntsb.gov**

We've had many requests from readers for information about the "black boxes" found on aircraft today. Here are some interesting facts about them.

Large commercial aircraft and some smaller commercial, corporate, and private aircraft are required by the FAA to be equipped with two "black boxes" that record information about a flight. Both recorders are installed to help reconstruct the events leading to an aircraft accident. One of these, the Cockpit Voice Recorder (CVR), records radio transmissions and sounds in the cockpit, such as the pilots' voices and engine noises. The other, the Flight Data Recorder (FDR), monitors parameters such as altitude, airspeed and heading. The older analog units use one-quarter inch magnetic tape as a storage medium, and the newer ones use digital technology and memory chips. Both recorders are installed in the most crash-survivable part of the aircraft, usually the tail section.

Each recorder is equipped with an Underwater Locator Beacon (ULB) in the event of an overwater accident. The device, called a "pinger," is activated when the recorder is immersed in water. It transmits an acoustical signal on 37.5 kHz that can be detected with a special receiver. The beacon can transmit from depths down to 14,000 feet.

KEY TO ABBREVIATIONS

ARTCC	Air Route Traffic Control Center
ATCSCC	Air Traffic Control System Command Center
AWIPS	Advanced Weather Interactive Processing System
CCFP	Collaborative Convective Forecast Product
CDM	Collaborative Decision Making
CVR	Cockpit Voice Recorder
CWA	Center Weather Advisory
CWSU	Center Weather Service Unit
FAA	Federal Aviation Administration
FDR	Flight Data Recorder
MIS	Meteorological Impact Statement
NTSB	National Transportation Safety Board
NWS	National Weather Service
TMU	Traffic Management Unit
TRACON	Terminal Radar Approach Control
ULB	Underwater Locator Beacon
URET	User Request Evaluation Tool System
VFR/IFR	Visual Flight Rules/Instrument Flight Rules
WARP	Weather and Radar Processor

Following an accident, both recorders are immediately removed from the accident site and transported to NTSB headquarters in Washington D.C. for processing. Using sophisticated computer and audio equipment, the information stored on the recorders is extracted and translated into an understandable format. The Investigator-in-Charge uses this information as one of many tools to help the Safety Board determine the probable cause of the accident.

❖ The Cockpit Voice Recorder

The CVR records the flight crew's voices, as well as other sounds inside the cockpit. The recorder's "cockpit area microphone" is usually located on the overhead instrument panel between the two pilots. Sounds of interest to an investigator could be engine noise, stall warnings, landing gear extension and retraction, and other clicks and pops. From these sounds, parameters such as engine rpm, system failures, speed, and the time at which certain events occur can often be determined. Communications with Air Traffic Control, automated radio weather briefings, and conversation between the pilots and ground or cabin crew are also recorded.

A CVR committee – usually consisting of members from the NTSB, FAA, operator of the aircraft, manufacturer of the airplane, manufacturer of the engines, and the pilots union – is formed to listen to the recording. This committee creates a written transcript of the tape to be used during the investigation.

FAA air traffic control tapes with their associated time codes are used to help determine the local standard time of one or more events during the accident sequence. These times are applied to the transcript using a computer process that provides a local time for every event on the transcript. More precise timing for critical events can be obtained using a digital spectrum analyzer. This transcript contains all pertinent portions of the recording and can be released to the public at the time of the Safety Board's public hearing.

The CVR recordings are treated differently than the other factual information obtained in an accident investigation. Due to the highly sensitive nature of the verbal communications inside the cockpit, Congress has required that the Safety Board not release any part of a CVR tape recording. Because of this sensitivity, a high degree of security is provided for the CVR tape and its transcript. The content and timing of release of the written transcript are strictly regulated: under federal law, transcripts of pertinent portions of cockpit voice recordings are released at a Safety Board public hearing on the accident or, if no hearing is held, when a majority of the factual reports are made public.

❖ The Flight Data Recorder

The FDR onboard the aircraft records many different operating conditions of the flight. By regulation, newly manufactured aircraft must monitor at least twenty-eight important parameters such as time, altitude, airspeed, heading, and aircraft attitude. In addition, some FDRs can record the status of more than 300 other in-flight characteristics that can aid in the investigation. The items monitored can be anything from flap position to auto-pilot mode or even smoke alarms.

With the data retrieved from the FDR, the Safety Board can generate a computer animated video reconstruction of the flight. The investigator can then visualize the airplane's attitude, instrument readings, power settings and other characteristics of the flight. This animation enables the investigating team to visualize the last moments of the flight before the accident.

Both the Flight Data Recorder and the Cockpit Voice Recorder have proven to be valuable tools in the accident investigation process. They can provide information that may be difficult or impossible to obtain by other means. When used in conjunction with other information gained in the investigation, the recorders are playing an ever-increasing role in determining the probable cause of an aircraft accident.

Specifications:

Flight Data Recorder
- Time recorded: 25 hour continuous
- Number of parameters: 5-300+
- Impact tolerance: 3400Gs /6.5ms
- Fire resistance: 1100 degC/30 min
- Water pressure resistance: submerged 20,000 ft.
- Underwater locator beacon: 37.5 kHz
- Battery: 6yr shelf life, 30 day operation

Cockpit Voice Recorder
- Time recorded: 30 min continuous, 2 hours for solid state digital units
- Number of channels: 4
- Impact tolerance: 3400 Gs /6.5ms
- Fire resistance: 1100 deg C /30 min
- Water pressure resistance: submerged 20,000 ft.
- Underwater locator beacon: 3 7.5 kHz
- Battery: 6yr shelf life, 30 day operation

❖ Center Weather Service Units

Each time I've visited an ARTCC (Air Route Traffic Control Center), I've had the opportunity to watch the meteorologists work at the Center Weather Service Units (CWSU), as well as to observe the air traffic controllers at their scopes. While most of us are aware of what the controllers do, few people understand the actual work of CWSU employees. Here's a look at what it's all about.

There are 21 Center Weather Service Units across the nation, one in each of the ARTCCs. ARTCCs provide air traffic control services to aircraft in the regions between airport Terminal Radar Approach Control facilities. They mainly serve aircraft on IFR (instrument flight rules) flight plans operating at the higher altitudes, but also can serve smaller aircraft through VFR (visual flight rules) flight following.

The need for weather personnel in each ARTCC was recognized in 1977 after the crash of Southern Airways flight number 242, which went down during a thunderstorm while enroute to Atlanta. The ensuing NTSB investigation suggested that meteorologists should be available to Air Traffic Controllers, and so the CWSU program was born.

Center Weather Service Units are comprised of National Weather Service meteorologists under contract to the FAA. Each CWSU provides meteorological support for 16 hours per day. Most are open from 5 or 6 am to 9 or 10 pm, when most commercial aircraft are in flight.

The FAA Traffic Management Unit (TMU) needs to be kept abreast of the latest changes in current and forecast weather. Meteorologists provide two daily "standup" briefings for the benefit of TMU personnel, supervisors from each area within the ARTCC, facility management staff and Airway Facilities personnel. These briefings begin by highlighting areas of active weather, then proceed to alert participants to potential future weather impacts during their shift. The main impact for air traffic is thunderstorm activity, with icing and turbulence a secondary concern. Low ceiling and visibility at major hub airports is also a prime concern.

CWSU meteorologists also participate in the FAA Collaborative Decision Making process (CDM) by taking part in the Collaborative Convective Forecast Product chat sessions on the internet. Each CCFP chat session features a proposed 2, 4 and 6 hour thunderstorm forecast chart, which is then discussed among the participants, including meteorologists from the major airlines as well as representatives from the Air Traffic Control System Command Center (ATCSCC). The final forecast product generated from these CCFP chat sessions becomes a key piece of information used by FAA Traffic Management personnel to formulate their Strategic Plan of Operations, which details how air traffic flows will be managed on any given day.

Meteorologists at the CWSUs also prepare two products, a Meteorological Impact Statement (MIS) and a Center Weather Advisory (CWA). The MIS product details weather expected to impact the safe and efficient flow of air traffic within the Center airspace within a 2 to 12 hour period. The CWA product is a short term "nowcast," pinpointing hazardous weather already causing an impact or expected to cause an impact within a 2 hour period. The MIS is for planning purposes only, while the CWA is an in-flight advisory.

CWSU meteorologists use a variety of computer hardware to receive and review data. The main system used is called WARP, or Weather and Radar Processor. This system provides satellite, radar and computer model data, as well as alphanumeric data. Data from the WARP system is now also being used to provide weather radar overlays on Air Traffic Controllers' radar displays and also supports the FAA's User Request Evaluation Tool system – a forward-looking program which allows pilots to select the most direct route (FAA Free-Flight Program).

CWSU meteorologists also possess a single screen AWIPS workstation, providing the same information available to their neighboring counterparts at the National Weather Service Weather Forecast Offices. This workstation allows a CWSU meteorologist to become familiar and proficient with the equipment used through the rest of the NWS, a definite plus if personnel decide to transfer. The Internet is also used quite extensively, due to its proliferation of information regarding weather in general. It also serves as backup should the main systems fail.

The life of a CWSU meteorologist is similar to other weather professionals – it's feast or famine. When weather impacts any part of the ARTCC airspace or the surrounding ARTCCs, the meteorologist is called upon to provide updates and short term forecasts. When thunderstorms block major air routes, accurate and timely forecasts are a must. Since safety is a huge issue in the world of aviation, some of the information provided by the CWSU can be a matter of life and death. Examples include providing weather support to controllers dealing with VFR pilots trapped on top of cloud decks, or assisting Traffic Management Coordinators during times when major airports are shut down by thunderstorms or other phenomena.

So what's in the future? Well, everyone wants better forecasts. With computer processing power increasing, the ability to deliver timely and more accurate forecasts should improve. (Thanks to CWSU Memphis for the above information.)

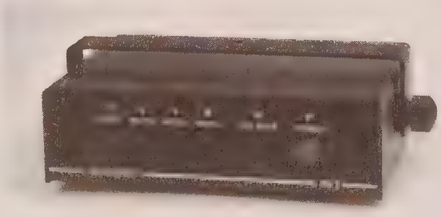
ANCHORAGE CENTER FREQS

Anchorage Center - (Anchorage) 132.3 121.5

Adak - 126.4
Annette Island - 118.5
Barrow - 135.3
Barter Island - 120.6
Bethel - 125.2
Bettles - 124.6
Big Delta - 135.3
Big Lake - 133.7
Biorka Island - 126.6
Cape Newenham - 127.6
Cold Bay - 118.5
Deadhorse - 134.4
Dutch Harbor - 124.4
Fort Yukon - 135.0, 132.7
Galbraith - 134.6
Galena - 127.0
Gambell - 132.2
Gulkana - 127.9, 119.5
Gustavus - 133.2
Homer - 133.8, 125.9
Iliamna - 118.8
Johnstone Point - 119.3
King Salmon - 124.8
Kenai Island - 125.7, 123.9, 119.7
Kodiak - 125.1
Kotzebue 119.2
Lena Point (Juneau) - 133.9
Level Island - 118.0
Mc Grath - 128.1
Middleton Island - 133.6
Murphy Dome - 133.1, 120.9
Nome - 133.3
Northway - 127.1
Point Lay - 118.9
Port Heiden - 132.9
St. Marys - 124.0
St. Paul Island - 128.2, 119.1
Shemya - 128.2, 119.1
Sparrevohn - 134.3, 128.5
Talkeetna - 118.2
Umiat - 119.4
Unalakleet - 135.
Yakutat - 119.0

That's all for June. Tune in again in August for some more frequencies, news and views. Until then, 73 and out.

— SCAN • A • MIX —— BX2 —



B & D Enterprises announces the availability of the new BX2. The BX2 is a mobile environment version of the popular BX1. It eliminates the need for multiple external speakers in your auto. Improves audio and provides convenient muting of receive audios.

The BX2 will combine four speaker level audio input signals to one 7 watt speaker output - eliminating the need for an external speaker for each receiver or transceiver. The BX2's inputs are transformer coupled allowing the BX2 to accept any source.

Please visit our website for applications and details on use.

ONLY $139.00

To order your BX2, call toll free:
888 280-8287
B & D Enterprises
P. O. Box 28362
San Jose, CA 95159
www.bdenterprises.com

AMERICAN BANDSCAN

THE WORLD OF DOMESTIC BROADCASTING

Doug Smith, W9WI

dougsmith@monitoringtimes.com

Bits and Pieces

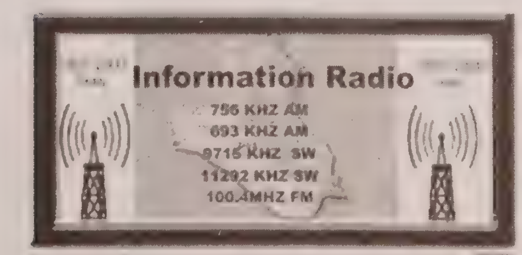
IBOC digital broadcasting has now been authorized for general use by U.S. AM and FM stations. Until March 20th, stations wishing to broadcast digitally were required to obtain special temporary authority from the FCC. (A list of stations holding such authority on March 6th is on **http://www.w9wi.com/articles/iboc.html**). After the 20th, any station may begin IBOC digital broadcasts at any time. Within ten days of beginning digital broadcasts, the station must notify the FCC.

AM stations may only operate digitally during the day; stations with "PSRA" (permission to operate between 6am and sunrise) and/or "PSSA" (permission to operate between sunset and 6pm) may also broadcast digitally during these hours. Stations are restricted to "hybrid mode" – simultaneous analog and digital transmission – and must carry the same program in digital that's carried in analog. (It is technically feasible to carry different programs. A "digital-only" mode exists in which additional programs or higher audio quality are possible, at the expense of incompatibility with existing analog receivers.)

You can determine on the Internet whether a station has notified the FCC of IBOC operations. Go to http://svartifoss2.fcc.gov/prod/cdbs/pubacc/prod/sta_sear.htm and type in the call letters. Click "Submit Search." On the resulting page, "click for details," then look for "Digital Status."

❖ Psych Over the Airwaves

Hopefully, by the time you read this, the fighting in Iraq will be over. The "Commando Solo" psychological operations unit was deployed again in this action. http://www.psywarrior.com/CommandoSoloIraqScripts.html has more information on their operations over Iraq. Frequencies cited are 693 and 756 AM, 100.4 FM, and 9715 and 11292 on shortwave; operations are between 6 and 11pm Iraq time. (That's 1500-2000 UTC) The BBC reports ground-based transmitters in Kuwait and other Gulf countries are also in use. Some sources suggest 690 kHz might be used instead of 693.



These leaflets announced the frequencies for U.S. military broadcasts to Iraq

The U.S. military dropped leaflets over Iraq announcing these broadcasts. Obviously the actual leaflets dropped were printed in Arabic, but the military provided English translations, one of which is reprinted elsewhere on this page. You can see the original Arabic on http://www.centcom.mil/galleries/leaflets/images/izd-001.jpg

Unlike past conflicts, at least at my deadline, the U.S. military seems to be avoiding damage to broadcast transmitters in Iraq. Studio facilities have been hit, reportedly in an attempt to stop satellite broadcasts to other countries. Such facilities will be easily repaired when the war is over. I would guess the military wants to be able to use the transmitters after the war to keep people informed. According to the *World Radio-TV Handbook*, the major AM frequencies used by the Iraqi government are 684, 693, 1035, and 1377 kHz. (The first two certainly do seem to conflict with U.S. military use of 693.)

❖ Old-Timer Out to Pasture?

Last year, a controversial proposal to switch legendary country music station WSM to all-sports was withdrawn after public outcry. In late March, WSM's sister FM station (and co-owned WWTN-FM) were sold to large group owner Cumulus. WSM-FM and WWTN-FM will join Cumulus' other stations WQQK-FM, WRQQ-FM, and WNPL-FM.

Cumulus didn't buy WSM-AM, but they did sign an agreement to handle ad sales for the legendary station. They will also carry the Grand Ol' Opry on many of their other stations. Few observers believe WSM-AM's current owners, Gaylord Entertainment, will keep the station for long. In fact, I'll be surprised if Gaylord still owns WSM by the time you read this. What *will* happen to the station? Good question. Keep a close ear on 650 kHz!

❖ AM Woes in Canada

The CBC website in Canada reports Canadian FM stations are doing well financially, while AM stations are having problems. Over the past five years, FM stations increased income 31%, but AM income declined almost 10%. French-language AM stations did even worse, losing 19% in revenue since 1998. Do, however, remember that Canadian AM stations are moving to FM in droves. It's very possible that revenues *per AM station* are steady or even up.

❖ Everything Old is New Again

After awhile, many DXers succumb to burnout. The thrill of the first few dozen new ones succumbs to the boredom of relogging the same stations over and over. The solution, of course, is to try something new.

Some DXers have taken to using "minimalist" radios. Old tube gear, 1950s table radios, 1930s "cathedral" sets, homemade radios, even crystal sets. There's a certain thrill to listening to a radio you built yourself – especially when that radio requires no batteries or AC power. http://www.midnightscience.com is a treasure trove of crystal radio projects. They even offer a book describing the design and construction of a self-powered *FM* crystal radio. (Old-timers will do a double-take on that. Yes, it *is* possible to build a FM crystal set.)

❖ WHOM Suffers Fire in February

Mount Washington, New Hampshire, is the highest point in New England – and has the world's worst weather. Because of the extreme elevation (and the excellent coverage), one of the earliest FM stations was built on this mountain. For many years, the ABC TV station covering Portland, Maine, broadcast from this peak, as have two modern-day FM stations.

A February fire destroyed the transmitter building, taking WHOM-FM with it. The TV station had moved their transmitter last year to a site closer to Portland, but the FM station was still in their building. A second FM station, WPKQ, was not damaged. However, all electricity on the peak was generated in the TV transmitter building, so WPKQ was forced off the air until temporary generators could be hauled to the peak (not easy in February!). At this time WHOM is also reported back on the air but at reduced power. See http://www.mountwashington.org for more information on this unique place.

❖ Watch for FM DX

AM DX has slowed down, but FM and TV should be breaking wide open. Hook up a set of rabbit ears, or tune that car radio to that unused spot *between* your favorite stations. There may be nothing but static – or there may be a dial-full of exotic stations from hundreds of miles away. Write me at 7540 Highway 64 West, Brasstown NC 28902-0098, or by email to *dougsmith@monitoringtimes.com*. Good DX!

OUTER LIMITS

THE CLANDESTINE, THE UNUSUAL, THE UNLICENSED

George Zeller
georgezeller@monitoringtimes.com

Slight Reduction in Pirate Activity

Several DX observers have noted that the war in Iraq quickly resulted in a decline in the volume of North American pirate radio broadcasts. Rumors circulated that station operators were more paranoid than usual about FCC enforcement possibilities.

Despite these rumors, our readers at *MT* turned in another fine performance of pirate radio DXing. As you see here this month, more than 20 pirate stations took to the airwaves despite the world conflict. Most activity remains on 6950 kHz, but stations have been known to broadcast anywhere within 30 kHz of this spot. Now that summer is here, it will be possible to hear many of these broadcasts after sunset, despite the longer hours of daylight.

❖ DXing Info

Mika Mäkeläinen, Editor of **DXing.info**, an internet DX resource from Finland, reminds *MT* readers that Mike's site is often a useful source of breaking DX information that you might otherwise miss in other publications. The internet URL of **http://www.dxing.info/** is the place to go for this one, which often had invaluable news during the Iraq-USA war. Meanwhile, Martin Schoech's tremendous Clandestine Radio Com web site remains a must-see source of similar information. At **http://www.clandestineradio.com/** you can get quick access to the amazing collection of clandestine radio material that is updated at least weekly.

❖ Information Radio

The USA's airborne clandestine voice has proven to be a much tougher DX catch in North America than it was when it targeted Afghanistan. But, some North American DXers are now producing loggings of them on 9715 kHz before 0200 UTC. The station is obviously of interest to most of us, though it may no longer be on the air in June. Some European DXers have also noticed decent signals from this one on 4500 kHz, but that one is almost impossible from North America.

❖ What We Are Hearing

Our readers heard all of these North American pirate broadcasters this month, despite an alleged decline in pirate broadcasting volume. Most broadcasts are found on 6950 or 6955 kHz, or on nearby frequencies. All pirates operate on a sporadic schedule, but shortwave pirate broadcasting increases noticeably on weekends, and during major holiday periods.

Big Thunder Radio- This relatively new station mixes rock music with genuine ads pirated from commercial radio and TV. (Uses *bigthunderradio@hotmail.com* e-mail)

Blind Faith Radio- This one still emphasizes a classic rock format. (Merlin)

Captain Morgan- Normally the Captain plays rock music, but once in a while some gospel tunes sneak their way in with some audio clips from the Twilight Zone. (None, asks for reports on the Free Radio Network web site)

He Man Radio- He Man is either an anti-feminist station or else a parody of sexism. Why not listen to him and judge for yourself? (Blue Ridge Summit)

Heroin Radio- They are not active very much, but *MT* received several loggings of their drug advocacy and pirate comedy shows. (Try Belfast)

Iron Man Radio- Their format consists of rock music and discussions of outer space, in what can only be described as a strange set of program productions. (None)

KRMI- Radio Michigan International mixes comedy, rock music, and cowboy tunes in a fashion that you will only hear on the pirate bands. (Uses *krmi6955@yahoo.com* e-mail)

Laser Hot Hits- This unusual European pirate plays rock music selections. It is sometimes hard to know if it is coming from Europe or from a North American transmitter. It does use a North American maildrop. (Merlin)

Radio Baghdad- The pirate radio bands have strangely been devoid of commentary on the war, but this one was an exception with their comedy and the old Radio Baghdad ID's and address announced. Another unidentified station transmitted an altered version of President Bush's State of the Union, in which the President promised to destroy civilization. (None)

Radio Bingo- The pirate radio bingo game still is fixed with John T. Arthur winning every time. The station still makes fun of Steve Anderson of **KSMR** despite the fact that Steve remains in government custody in Kentucky. (Try *yahwehradio6925@yahoo.com* e-mail)

Radio Free Euphoria- Captain Ganja's station is the king of all the drug advocacy pirates. Whether or not you favor the use of drugs, Mr. Ganja's comedy will tickle your funny bone. (Belfast)

Radio Pigmeat International- Joe Wood sent in a log for this one on 6925 kHz right at column deadline time. He heard a show of primarily classic rock music. (Appears to use *pigmeat_voab@yahoo.com* e-mail)

Radio Spaceman- This is another Europirate whose broadcasts on 6289.9 kHz have sometimes been making it across the ocean to North America. (Neede)

Sensation AM- This Europirate is sending out QSLs that feature a photo of their Rhode and Schwarz transmitter. (Uses *sensationam@hotmail.com* e-mail)

Shadow Radio- Sometimes using a WSDW call letter ID, this one mixes rock music with relays of old time radio "The Shadow" detective shows. (Uses *the_shadow6950@hotmail.com* e-mail)

Sycko Radio- Sounding phonetically like Psycho Radio, this one still features rock music and pirate radio advocacy. (Still none)

Undercover Radio- Dr. Benway is still active with an eclectic format that he sometimes calls

Voodoo Radio- This new one has little to do with strange religions, but instead has been concentrating on rock music. (Uses *vudu11@hotmail.com* e-mail)

WHYP- The James Brownyard memorial station has branched out into comedy about pirate radio issues and DXing in general. (Providence)

WJFK- This John F. Kennedy memorial station often appears on November 22 each year, but it sometimes is active on a random basis at other times. The QSL that we picture here from them this month arrived in the mailboxes of many DXers who heard them, and also in the mailboxes of some DXers who did not hear them. So, they may be the best verifier on the shortwave radio bands today. (None, but obviously verifies)

WMOE- The Three Stooges memorial station throws some rock music in their shows along with noises from Larry, Curly, and Moe. (Belfast)

WMPR- Their "dance party" format of techno rock with a Micro Power Radio slogan is now a familiar presence on the pirate bands. (Still none)

❖ QSLing Pirates

Reception reports to pirate stations require three first class stamps for USA maildrops or $2 US to foreign locations. The cash defrays postage for mail forwarding and a souvenir QSL to your mailbox. Letters go to these addresses, identified above in parentheses: PO Box 1, Belfast, NY 14711; PO Box 28413; Providence, RI 02908; PO Box 293, Merlin, Ontario N0P 1W0, Canada; PO Box 109, Blue Ridge Summit, PA 17214 and P.O. Box 73, 7160-AB Neede, Netherlands.

Some pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. The best bulletins for sending pirate loggings with a hope that pirates might QSL them remain *The ACE* ($2 US for sample copies via the Belfast address above) and the e-mailed *Free Radio Weekly* newsletter, still free to contributors via **niel@ican.net**. The Free Radio Network web site, another outstanding source of content about pirate radio, is found at **http://www.frn.net** on the internet.

❖ Thanks

Your loggings and news are always welcome via 7540 Highway 64 W, Brasstown, NC 28902, or via the e-mail address atop the column. We thank this month's valuable contributors: John T. Arthur, Belfast, NY; Scott R. Barbour Jr., Intervale, NH; Artie Bigley, Columbus, OH; Jerry Berg, Lexington, MA; Jerry Coatsworth, Merlin, Ontario; Gerry Dexter, Lake Geneva, WI; Brian Duddy, Nyack, NY; Jilly Dybka, TN; Ulis Fleming, Glen Burnie, MD; Harold Frodge, Midland, MI; William Hassig, Mount Prospect, IL; Harry Helms, Las Vegas, NV; Chris Lobdell, Stoneham, MA; Greg Majewski, Oakdale, CT; Mika Mäkeläinen, Finland; Larry Magne, Penn's Park, PA; Bill Matthews, Columbus, OH; Bill McClintock, Wellington, OH; Terry Provance, San Diego, CA; Lee Reynolds, Lempster, NH; Martin Schoech, Merseburg, Germany; John Sedlacek, Omaha, NE; Lee Silvi, Mentor, OH; Robert Wieland, Dover, DE; Niel Wolfish, Toronto, Ontario, and Joe Wood, Gray, TN.

SATELLITE SERVICES

MT TRANSPONDER GUIDE *www.monitoringtimes.com/mtssg.html*

Robert Smathers
robertsmathers@monitoringtimes.com

All Frequencies MHz

SES Americom GSTAR-4

Ku-Band - 105 degrees West longitude

T01(H)	11730	Occasional video
T02(H)	11791	Occasional video
T03(H)	11852	Occasional video
T04(H)	11913	Occasional video
T05(H)	11974	Occasional video
T06(H)	12035	Occasional video
T07(H)	12096	Occasional video
T08(H)	12157	Occasional video
T09(V)	11744	Occasional video
T10(V)	11805	Occasional video
T11(V)	11866	Occasional video
T12(V)	11927	Occasional video
T13(V)	11988	Occasional video
T14(V)	12049	Occasional video
T15(V)	12110	Occasional video
T16(V)	12171	Occasional video

Telesat Canada Anik F1

C-Band - 107.3 degrees West longitude

1A(H)	3720	Occasional video
S1A(H)	3720	South-American beamed transponder
1B(V)	3740	Data Transmissions
2A(H)	3760	Canadian Broadcasting Corporation (CBC) (digital)
S2A(H)	3760	South-American beamed transponder
2B(V)	3780	Musimax, Musique Plus, Radio Mutual, Magneotheque, RDS, Canal Nouvelle (digital)
3A(H)	3800	Data Transmissions
S3A(H)	3800	South-American beamed transponder
3B(V)	3820	Occasional video
4A(H)	3840	(none)
S4A(H)	3840	South-American beamed transponder
4B(V)	3860	Occasional video
5A(H)	3880	Occasional video
S5A(H)	3880	South-American beamed transponder
5B(V)	3900	Global TV (digital) / Cancom (digital)
6A(H)	3920	Radio Canada (digital)
S6A(H)	3920	South-American beamed transponder
6B(V)	3940	Cancom (digital) / Aboriginal People's Television Network (digital)
7A(H)	3960	CBC Radio (digital) / Data Transmissions
S7A(H)	3960	South-American beamed transponder
7B(V)	3980	Cancom (digital)
8A(H)	4000	Occasional video
S8A(H)	4000	South-American beamed transponder
8B(V)	4020	Occasional video
9A(H)	4040	CBC feeds (digital)
S9A(H)	4040	South-American beamed transponder
9B(V)	4060	Meteo Media, TV 5 USA, TV5 France, Blue Bonnet, Radio Quebec (digital)
10A(H)	4080	Data Transmissions
S10A(H)	4080	South-American beamed transponder
10B(V)	4100	CTV, Newsworld International, The Weather Network (digital)
11A(H)	4120	Occasional video
S11A(H)	4120	South-American beamed transponder
11B(V)	4140	Occasional video
12A(H)	4160	CBC feeds (digital)
S12A(H)	4160	South-American beamed transponder
12B(V)	4180	Occasional video

Telesat Canada Anik F1

Ku-Band - 107.3 degrees West longitude

T1(V)	11714	Star Choice (digital)
T2(V)	11744	Star Choice (digital)
T3(V)	11775	Star Choice (digital)
T4(V)	11807	Star Choice (digital)
T5(V)	11836	Star Choice (digital)
T6(V)	11867	Star Choice (digital)
T7(V)	11897	Star Choice (digital)
T8(V)	11928	Star Choice (digital)
T9(V)	11960	Star Choice (digital)
T10(V)	11990	Star Choice (digital)
T11(V)	12020	Star Choice (digital)
T12(V)	12051	Star Choice (digital)
T13(V)	12081	Star Choice (digital)
T14(V)	12113	Star Choice (digital)
T15(V)	12140	Star Choice (digital)
T16(V)	12172	Star Choice (digital)
T17(H)	11725	Star Choice (digital)
T17S(H)	11725	South-American beamed transponder
T18(H)	11756	Star Choice (digital)
T18S(H)	11756	South-American beamed transponder
T19(H)	11786	Star Choice (digital)
T19S(H)	11786	South-American beamed transponder
T20(H)	11817	Star Choice (digital)
T20S(H)	11817	South-American beamed transponder
T21(H)	11850	Star Choice (digital)
T21S(H)	11850	South-American beamed transponder
T22(H)	11880	Star Choice (digital)
T22S(H)	11880	South-American beamed transponder
T23(H)	11910	SRC feeds (digital)
T23S(H)	11910	South-American beamed transponder
T24(H)	11940	CBC feeds (digital)
T24S(H)	11940	South-American beamed transponder
T25(H)	11971	Star Choice (digital)
T25S(H)	11971	South-American beamed transponder
T26(H)	12002	Star Choice (digital)
T26S(H)	12002	South-American beamed transponder
T27(H)	12033	Star Choice (digital)
T27S(H)	12033	South-American beamed transponder
T28(H)	12063	Star Choice (digital)
T28S(H)	12063	South-American beamed transponder
T29(H)	12094	Star Choice (digital)
T29S(H)	12094	South-American beamed transponder
T30(H)	12124	Star Choice (digital)
T30S(H)	12124	South-American beamed transponder
T31(H)	12155	Star Choice (digital)
T31S(H)	12155	South-American beamed transponder
T32(H)	12180	Star Choice (digital)
T32S(H)	12180	South-American beamed transponder

Satelites Mexicanos Morelos 2

C-Band - 109.1 degrees West longitude

1W/L(H)	3720	(none)
1N(V)	3740	(none)
1W/U(H)	3760	(none)
2N(V)	3780	(none)
2W/L(H)	3800	(none)
3N(V)	3820	(none)
2W/U(H)	3840	(none)
4N(V)	3860	(none)
3W/L(H)	3880	(none)
5N(V)	3900	(none)
3W/U(H)	3920	(none)
6N(V)	3940	(none)
4W/L(H)	3960	(none)
7N(V)	3980	(none)
4W/U(H)	4000	(none)
8N(V)	4020	(none)
5W/L(H)	4040	(none)
9N(V)	4060	(none)
5W/U(H)	4080	(none)
10N(V)	4100	(none)
6W/L(H)	4120	(none)
11N(V)	4140	(none)
6W/U(H)	4160	(none)
12N(V)	4180	(none)

Satelites Mexicanos Morelos 2

Ku-Band - 109.1 degrees West longitude

T01K(H)	11764	(none)
T02K(H)	11888	(none)
T03K(H)	12012	(none)
T04K(H)	12136	(none)

TeleSat Canada Anik E2

C-Band - 111.1 degrees West longitude

1A(H)	3720	Data Transmissions
1B(V)	3740	Occasional video
2A(H)	3760	Data Transmissions
2B(V)	3780	Data Transmissions
3A(H)	3800	Data Transmissions
3B(V)	3820	Occasional video
4A(H)	3840	Data Transmissions
4B(V)	3860	Data Transmissions
5A(H)	3880	Data Transmissions
5B(V)	3900	Occasional video
6A(H)	3920	Occasional video
6B(V)	3940	Occasional video
7A(H)	3960	(Inactive)
7B(V)	3980	Occasional video
8A(H)	4000	Occasional video
8B(V)	4020	Occasional video
9A(H)	4040	Occasional video
9B(V)	4060	(Inactive)
10A(H)	4080	Data Transmissions
10B(V)	4100	Data Transmissions
11A(H)	4120	Data Transmissions / Analog audio SCPC Services 1036.70 63.30 Wal-Mart In-store Network (Canada) 1037.00 63.00 Wal-Mart In-store Network (Canada) 1037.50 62.50 Wal-Mart In-store Network (Canada)
11B(V)	4140	Data Transmissions
12A(H)	4160	Data Transmissions
12B(V)	4180	(Inactive)

Telesat Canada Anik E2

Ku-Band - 111.1 degrees West longitude

T01(V)	11717	Data Transmissions
T02(V)	11743	Data Transmissions
T03(V)	11778	Data Transmissions
T04(V)	11804	Data Transmissions
T05(V)	11839	Data Transmissions
T06(V)	11865	Occasional video
T07(V)	11900	Occasional video
T08(V)	11926	Novanet (digital)
T09(V)	11961	Saskatchewan Communications Network (SCN) (digital)
T10(V)	11987	Star Choice (digital)
T11(V)	12022	Star Choice (digital)
T12(V)	12048	Star Choice (digital)
T13(V)	12083	Star Choice (digital)
T14(V)	12109	Star Choice (digital)
T15(V)	12144	Ground Loop Attitude Control System (GLACS) (digital)
T16(V)	12170	Star Choice (digital)
T17(H)	11730	Data Transmissions
T18(H)	11756	Data Transmissions
T19(H)	11791	Data Transmissions
T20(H)	11817	Data Transmissions
T21(H)	11852	Star Choice (digital)
T22(H)	11878	Star Choice (digital)
T23(H)	11913	Data Transmissions
T24(H)	11939	Data Transmissions
T25(H)	11974	Star Choice (digital)
T26(H)	12000	Star Choice (digital)
T27(H)	12035	Star Choice (digital)
T28(H)	12061	Star Choice (digital)
T29(H)	12096	Star Choice (digital)
T30(H)	12122	Ground Loop Attitude Control System (GLACS) (digital)
T31(H)	12157	Star Choice (digital)
T32(H)	12183	Star Choice (digital)

Satelites Mexicanos Solidaridad 2

C-Band - 113 degrees West longitude

1N(V)	3720	PCTV – Television Por Cable (digital)
1W/L(H)	3740	Data Transmissions
2N(V)	3760	Data Transmissions / TVSat (digital)
1W/U(H)	3780	Data Transmissions / Television and Radio TeleMichoacan (digital)
3N(V)	3800	Edusat (digital)
2W/L(H)	3820	Data Transmissions
4N(V)	3840	Data Transmissions / Television and Radio Mas (digital) / Television Tabasquena (TVT) (digital)
2W/U(H)	3860	Data Transmissions / TV Azteca 7 (digital) / RGT (digital) / Television Mexiquense (digital)
5N(V)	3880	(none)
3W/L(H)	3900	Data Transmissions / XHAOX-TV 9 Oaxaca (digital) / Central TV (digital)
6N(V)	3920	Data Transmissions
3W/U(H)	3940	Data Transmissions
7N(H)	3960	(none)
4W/L(H)	3980	Data Transmissions
8N(V)	4000	Data Transmissions
4W/U(H)	4020	Data Transmissions
9N(V)	4040	MVS Television Empresarial (digital)
5W/L(H)	4060	Data Transmissions / In-Store Radio (digital)
10N(V)	4080	Data Transmissions
5W/U(H)	4100	Data Transmissions / XHRCG-TV 7 Coahuila (digital)
11N(V)	4120	(none)
6W/L(U)	4140	(none)
12N(V)	4160	Data Transmissions
6W/U(H)	4180	Data Transmissions / Television and Radio Hidalgo (digital) / TV Nuevo Leon (digital)

BELOW 500 kHz

DXING THE BASEMENT BAND

Kevin Carey, WB2QMY
kevincarey@monitoringtimes.com

Adventures with NAVTEX

With the boating season in full swing, June is an excellent time to tune in to NAVTEX (Navigational Telex) transmissions at 518 kHz. NAVTEX is an internationally standardized method of sending bulletins to vessels equipped with low cost digital receiving equipment. While many small boaters use NAVTEX, it is *required equipment* aboard larger vessels per the Safety of Life at Sea (SOLAS) convention.

NAVTEX is an adjunct to the Global Maritime Distress and Safety System (GMDSS) and provides vital weather and navigation safety information at a range far exceeding that of conventional VHF marine radio. NAVTEX bulletins contain data on aids to navigation, search and rescue operations, weather hazards, military exercises and other important notices to mariners. For the hobby listener, it can provide a welcome change of pace from traditional beacon hunting.

❖ Required Equipment

NAVTEX bulletins can be decoded using fairly simple equipment. The first consideration is the receiver itself. It's best if it has an RTTY mode that can be optimized for receiving NAVTEX signaling tones. However, any stable receiver with an SSB/CW setting or a BFO (Beat Frequency Oscillator) can provide satisfactory results if signals are strong and clear.

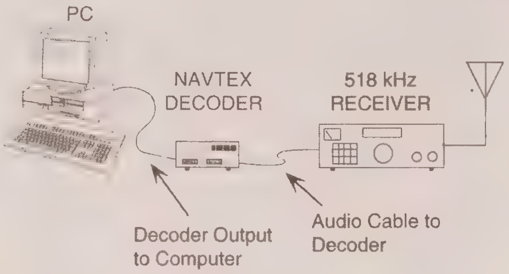
Besides your receiver, a personal computer and decoder are required. An audio sample from the receiver is applied to the decoder, which, in turn outputs a digital signal to the computer, where NAVTEX messages can be viewed on-screen. Figure 1 shows a typical NAVTEX setup.

As an alternative to using a computer, self-contained "Readers" for NAVTEX are also available. These units have a built-in display screen and often include a printer output port so you can save a hard copy of the bulletins you receive. These Readers connect directly to a receiver's audio output and require no other interface equipment.

A number of manufacturers make equipment for NAVTEX reception. Universal Radio, Inc. of Reynoldsburg, OH (**http://www.universal-radio.com**) has a longstanding reputation as a supplier of digital receiving gear. Their website contains a wealth of tutorial information on data reception, and they also maintain a Technical Information line during normal business hours at (614) 866-4267.

❖ Tuning In

NAVTEX is transmitted primarily on 518 kHz, but you may find some limited activity at 490 kHz and 4209.5 kHz, mostly outside the U.S. Signals are transmitted in SITOR Mode B (FEC Mode). This mode is similar to the AMTOR protocol used by hams, but it is optimized for one-way broadcast as opposed to the "chirp-chirp" two-way exchanges commonly heard on the amateur bands. Nevertheless, most ham-grade RTTY terminal units do have the capability to receive NAVTEX by simply selecting "AMTOR Mode B."



❖ Stations, Schedules and Content

NAVTEX stations are located in key coastal areas that provide reliable coverage from 0 to 200 miles offshore. Table 1 shows selected stations believed to be active at this writing. If you live close to one of these sites, you should be able to receive transmissions even during daylight hours. At night, it's likely that you'll be able to hear signals from multiple stations. There are many other NAVTEX installations operating worldwide. In all cases, your best bet is to check 518 kHz at various times throughout the day for activity.

NAVTEX stations transmit their messages on a four-hour cycle, 24 hours a day. Starting times for several stations are provided in the chart below. Each message is preceded by "ZCZC," and then a four-character header that indicates the station ID (B1), the subject of the message (B2), and a four character designator (B3, B4) carrying the message number. The message number can be used by commercial NAVTEX receivers to ignore already-received messages.

Table 1. Selected NAVTEX Stations (518 kHz)

Location	(B1 Ident.)	Start Time (UTC)
Boston, MA	F	0045
Chesapeake, VA	N	0130
Savannah, GA	E	0040
Miami, FL	A	0000
San Juan, PR	R	0200
New Orleans, LA	G	0300
Point Reyes, CA	C	0000
Cambria, CA	Q	0045
Astoria, OR	W	0130
Kodiak, AK	J	0300
Honolulu, HI	O	0040
Guam	V	0100
Long Beach, CA	Q	0445
Labrador, NF	X	0350
St. John's, NF	O	0220
Sept-Iles, QC	C, D	0020, 0035
Sydney, NS	Q, S	0240, 0255
Yarmouth, NS	U, V	0320, 0335
Montreal, QC	W, T	0340, 0355
Thunder Bay, ON	P	0230
Wiarton, ON	H	0110
Bermuda	B	0010
Tofino, Vancouver Isl., BC	D	0110
Prince Rupert, BC	D	0030

❖ Subject Indicators

The subject indicator (B2) of a NAVTEX transmission identifies the category of message to be sent (weather, piracy alerts, ice reports, etc.). Subject indicators are listed in Table 2 below. Commercial NAVTEX receivers can be programmed to reject certain subjects that are of no interest to the user. Some messages, however, *cannot* be rejected due to their importance. These are designated by an asterisk in Table 2.

Table 2. NAVTEX Subject Indicators

A = Navigational warnings*
B = Meteorological warnings*
C = Ice reports
D = Search & rescue information, and pirate warnings*
E = Meteorological forecasts
F = Pilot service messages
G = DECCA messages
H = LORAN messages
I = OMEGA messages (note OMEGA has been discontinued)
J = SATNAV messages (i.e. GPS or GLONASS)
L = Navigational warnings - additional to letter A (Should not be rejected by the receiver)
V = Notice to Fishermen (U.S. only - currently not used)
W = Environmental (U.S. only - currently not used)
X } Special services - allocation by IMO NAVTEX Panel
Y } Special services
Z = No message on hand

I would like to extend special thanks to Doug Robertson (CA) for his assistance in gathering material for this month's topic. You will find addition technical details, coverage charts and schedules for NAVTEX stations on the U.S. Coast Guard's website at **http://www.navcen.uscg.gov/marcomms/gmdss/navtex.htm**. Happy listening and printing.

ON THE HAM BANDS

THE FUNDAMENTALS OF AMATEUR RADIO

T.J. "Skip" Arey, N2EI
tjarey@monitoringtimes.com

When PIGs Fly

You may recall a number of months back I talked about getting involved in building a transceiver kit called the *multiPIG+*. More than a few of you e-mailed to ask how things were going so I thought I'd give a SITREP.

This project was designed by Dieter "Diz" Gentzow W8DIZ. The project and the process surrounding it was unique to anything I have ever been part of. Over a number of months, the builders involved in this bit of fun would periodically receive a PC board and parts with which we would set about building a particular section of the rig. Using *yahoogroups.com* we would discuss our building and debugging of each stage. We would share problems, ideas, improvements and modifications. Throughout the process Diz would be guiding as well as taking in feedback that led to each successive stage of development and building. Further, the design of this rig is, to borrow a term of the computer world, *Open Source* in that it was expected that the whole thing would be built sort of spread out and jumpered together to encourage further development, modification and plain old everyday tinkering. In other words, used to its full potential, the multiPIG+ would never see the inside of a traditional electronic equipment case.

Overall, the project has been a total blast. As you can see by the graphic with this article, my multiPIG+ is laid out on a large slab of copperclad printed circuit board. I've mounted the ancillary dials and switches on standoffs with clear acrylic to keep everything visible. Remember those anatomy models like *The Visible Man*? Well think of this as *Uncle Skip's Visible Transceiver*! Whenever I get done doodling with the design, I plan to mount the unit into a picture frame and hang it on my wall. A piece of art that can work the world! Now that is something truly unique.

Anyway, I now am in possession of a homebuilt, all ham bands transceiver that has the potential for some real fun. But you see, I have this problem. I haven't gotten around to getting the thing on the air yet, because every time I go down to my workbench to finish things off I come up with another tweak or twist that I just have to try out, leading to adjustments and alignments and this and that. You know how it is with hardware hackers. I expect I'll be on the air with my multiPIG+ by the time you read this article, but if you hear me using something else you know I'm still having all sorts of fun just feeding the thing into a dummy load on my workbench and watching the oscilloscope traces.

Suggested Caption: Uncle Skip's "Visible Transceiver" the multiPIG+

This design is a challenge for even experienced builders and home brewers, but if you want to accept the challenge of building a unique transceiver, you can still get in on the fun by heading over to Diz's website **http://www.kitsandparts.com**. By the way, while you're there, Diz is a great source for toroid cores for all manner of RF projects. Tell him N2EI sent you.

❖ It's That Time Again

Yes, do not forget that June 28 & 29 is the annual ARRL Field Day weekend. If you are not in a ham club, this is a good time to find one and introduce yourself. It doesn't even matter if you have a license or not. Part of the heart of this activity is introducing new folks to the hobby and giving beginners a chance to get on the air. Back in the days when there were Novice Class hams, more than a few folks made their first contact at a Field Day station.

Old Uncle Skip will be found out there operating QRP and Solar Power, CW and SSB. My log will also be good for the QRP ARCI Milliwatt Field Day held at the same time. Two operating activities for the price of one. It doesn't get any better than this!

❖ Good Summer Reading

One of the classic texts dealing with the serious electronics and design aspects of amateur radio is a book called *Introduction to Radio Frequency Design* by Wes Hayward, W7ZOI. While this book is second to none as a resource for information on RF theory, it always leaves me with a desire to smell solder melting. I lean toward the more practical aspects of ham radio hardware hacking.

Well, Wes is back and he brought his Posse with him this time with a great new book.

Experimental Methods in RF Design
By Wes Hayward, W7ZOI, Rick Campbell
KK7B & Bob Larkin W7PUA et al
512 pages + CD ROM ARRL Order No. 8799
$49.95
ISBN: 0-87259-879-9
The American Radio Relay League
2254 Main Street
Newington, CT 06111-1494
http://www.arrl.org

My copy of *Experimental Methods in RF Design* came in the mail as I was packing up to go to the annual Kulpsville Winter SWLfest. In the midst of all of the fun and fellowship of that gathering I kept finding myself sneaking back to my room periodically to read a few more pages (and as you will see in a few moments, plan a few projects). This book contains page after page of practical and proven circuits with full explanations of the theory to support the various designs.

If you have never picked up a soldering iron but want to get started in building your own gear, I strongly recommend the first chapter of this book to you. It all begins with an extended discussion of basic homebrewing techniques with an emphasis on starting from scratch. This is followed by theory and block diagrams of a very basic but functional IC based direct conversion receiver.

Once you have your receiver up and running you can follow on with the designs for a power supply, CW transmitter and power amplifier and a few other support circuits such as a low pass filter. In less than twenty-five pages and for about fifty dollars (or much less with a well stocked junk box) you can be on the air and proudly announcing to the world STN HR IS HMBRW.

Succeeding chapters cover in detail the main aspects of RF science as applied to amateur radio with such topics as Amplifier Design Basics, Filters & Impedance Matching Circuits, Oscillators & Frequency Synthesis, Mixer & Frequency Multipliers, Transmitters & Receivers, Measurement Equipment, a further study of Direct Conversion Receivers, Phasing Receivers & Transmitters, Digital Signal Processing, and an entire final chapter of designs for rigs for Field Operation, Portable Operation and even fully Integrated Stations. Each chapter gives the reader a practical understanding of the subject matter along with any number of circuits that can be tried out or compared with existing designs in commercial equipment. What could be more instructional than building a circuit while learning the theory behind it? Before I was half way through reading I had blown my parts budget for the next two years on ideas I just have to try out.

Further, the book comes with a CD-ROM full of articles and references that support and expand on the projects and designs of the book. The CD-ROM also includes a number of programs to support beginning experiments with Digital Signal Processing.

Now for the big secret… Shhhhh… Don't tell anyone Old Uncle Skip told you!!!

If you can handle the basic stuff in the first chapter, the basic theory and the simple construction projects… There is nothing else is the book that is beyond your grasp! The big secret of radio design is that everything is a series of building blocks. Essentially, you take a number of these building blocks and put them together and you have a receiver, transmitter or whatever. That is the idea behind the multiPIG+ I mentioned earlier in this article. Wes Hayward and his group put that level of skill and understanding within the reach of any ham radio operator with a bit of desire to learn and a further desire to have a whole lot of fun.

Now I know building things isn't everyone's cup of tea. No problem. Wes and company's book is a good study just the same and you can get a lot out of reading the theory and tracing the schematic.

Even if you don't plan to build any of your own radios I would recommend to you the chapter on Measurement Equipment. It is an excellent basic study of how to make use of test gear. And, of course, if you are so inclined, you can *make* your own test gear.

This book also opens the door to the study of Digital Signal Processing. Once a topic reserved for engineering labs, DSP is now within the grasp of any dedicated ham experimenter. And this point makes a great transition to the subject matter of the next book…

DIGITAL SIGNAL PROCESSING TECHNOLOGY
Essential of the Communications Revolution
By Doug Smith KF6DX
236 pages ARRL Order No. 8195
$44.95
ISBN: 0-87259-819-5
The American Radio Relay League

A couple of years ago at a radio gathering, Alan Johnson N4LUS said "I have seen the future and it is digital!" Alan was right on target. If you look at the specifications and advertising blurbs related to any moderate or high end receiver these days, you will see the prominent place DSP has taken.

Doug Smith KF6DX (*NOT MT*'s own W9WI) has edited *QEX*, the ARRL journal for communications experimenters, since 1998. He was also one of the designers of the Kachina 505DSP transceiver. He brings his knowledge and skill in digital radio techniques and shares it with us mere radio mortals in a manner that is instructive and enjoyable.

The book begins with a general explanation of DSP and how it improves performance at reasonable cost when compared to traditional signal processing methods. Doug goes on to give a history of DSP applications and follows with a comprehensive study of digital sampling and data conversion. The book examines the practical aspects of digital filter design including the mathematics behind the techniques. Doug takes the reader through the design of a digital transceiver. This includes the theory and block diagrams to guide the reader into the heart of the matter. The book goes on to highlight current DSP research that is likely to have a direct effect on future amateur radio products and practice.

If you are not well versed in basic RF theory I must admit parts of this book will make your head spin; however, persevere and you will be rewarded with sufficient understanding of this important topic to guide your future radio purchases. That alone is worth the cover price.

❖ Shamless Plug

I am happy to announce that Old Uncle Skip's magnum opus *Radio Monitoring: The How To Guide*, has entered its second printing. I'd like to think that this is largely due to the many *Monitoring Times* readers who have thought enough of what I write about to support my meager efforts by picking up a copy. Many thanks to everyone! If you don't have a copy or want to give one to someone who is just starting out in the radio hobby here's the info.

Radio Monitoring: The How To Guide
By T.J. "Skip" Arey N2EI
337 pages
$19.95
ISBN: 1-58160-405-X
Paladin Press
7077 Winchester Circle
Boulder, CO 80301
(303) 443-7250
www.paladin-press.com

Well, enough of that. Time to open the log and put a few contacts in it before the band closes. Have fun! I'll see you on the bottom end of 40 meters.

UNCLE SKIP'S CONTEST CORNER

Asia-Pacific Sprint, (SSB)
Jun 14 1100 UTC-1300 UTC

West Virginia QSO Party
Jun 14 1600 UTC - Jun 15 0200 UTC

ARRL June VHF QSO Party
Jun 14 1800 UTC - Jun 16 0300 UTC

All Asian DX Contest, (CW)
Jun 21 0000 UTC - Jun 22 2400 UTC

SMIRK Contest
Jun 21 0000 UTC - Jun 22 2400 UTC

Kid's Day Contest
Jun 21 1800 UTC – 2400 UTC

Marconi Memorial HF Contest
Jun 28 1400 UTC - Jun 29 1400 UTC

ARRL Field Day
Jun 28 1800 UTC -2100 UTC, Jun 29

QRP ARCI Milliwatt Field Day
Jun 28 1800 UTC - Jun 29 2100 UTC

His Maj. King of Spain Contest, (SSB)
Jun 28 1800UTC - Jun 29 1800 UTC

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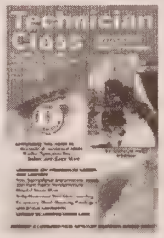

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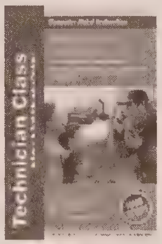

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ANTENNA TOPICS

BUYING, BUILDING AND UNDERSTANDING ANTENNAS

Clem Small, KR6A
clemsmall@monitoringtimes.com

Radio Direction-Finding Antennas

Antenna designs useful for radio direction-finding (RDF) have been around since the early days of crystal-detector receivers. RDF has proven its worth in such applications as finding the location of enemy radio transmitters, and in determining the location of sea-going vessels in distress. A more mundane use is tracking down sources of troublesome radio-frequency interference: for example, unintentional interference caused by electrical appliances. RDF is also useful for locating sources of intentional jamming and interference. It can even be used to track stolen vehicles if the vehicle has been outfitted for this service. And let's not overlook the emergency locator transmitters (ELTs) installed in aircraft to provide a transmitted signal for RDF if the aircraft crashes.

A very enjoyable use for RDF is the popular radio sport called "fox hunting," also known as "transmitter hunting," "T-hunting," and "bunny hunting." For a fox hunt an amateur radio operator operates a hidden transmitter (the fox, or bunny), and the hunters try to find the transmitter by using RDF techniques. On some hunts the hunters carry portable receivers with small RDF antennas as they search. When the hunt covers a large area the hunters usually ride in vehicles with mobile radios, and their RDF antennas are usually larger than on the pedestrian-mode hunts.

During transmissions the radio operator may give the hunters clues about the transmitter's location, or taunt them a bit about not yet having found the fox. All the while the hunters are trying to zero in on the location of the fox by using their directional antennas. When everyone has found the fox there is usually a celebration with refreshments, or sometimes a potluck party!

❖ Some RDF Antennas

Rotatable beam antennas, such as the Yagi-Uda and the quads, can be used to determine the direction from which a received signal originates. Rotating the beam for maximum signal as the direction indicator can be done, but this is imprecise, due to the width of the major lobe. Nulls (directions of minimum signal) are often quite narrow, and so nulls are usually the preferable direction indicator. Signal-strength meters are more reliable indicators of the strength of lobes and nulls than is loudness of received signals.

Perhaps the most remarkable RDF antenna is the Wullenweber, or Elephant Cage antenna. One HF version of this antenna consists of 100 ft high vertical antenna elements arranged in a giant-sized circle with a radius of hundreds of feet. Within the ring of antennas is an inner circle of shielding which is over 100 ft tall. This antenna is capable of very precise direction indications.

Loops are the oldest direction-finder antenna design still in use. Although they typically give a bi-directional direction reading, their response can be made unidirectional with the addition of a separate "sense" antenna. By monitoring enemy shipboard wireless signals, the Bellini-Tosi, a special loop design, was quite successful during the First World War in detecting enemy-ship movements.

With any RDF antenna there may be problems caused by signal reflections from objects in the environment or even by variations in mode of signal propagation. The Adcock antenna was developed to reduce such problems that plagued loop RDF antennas.

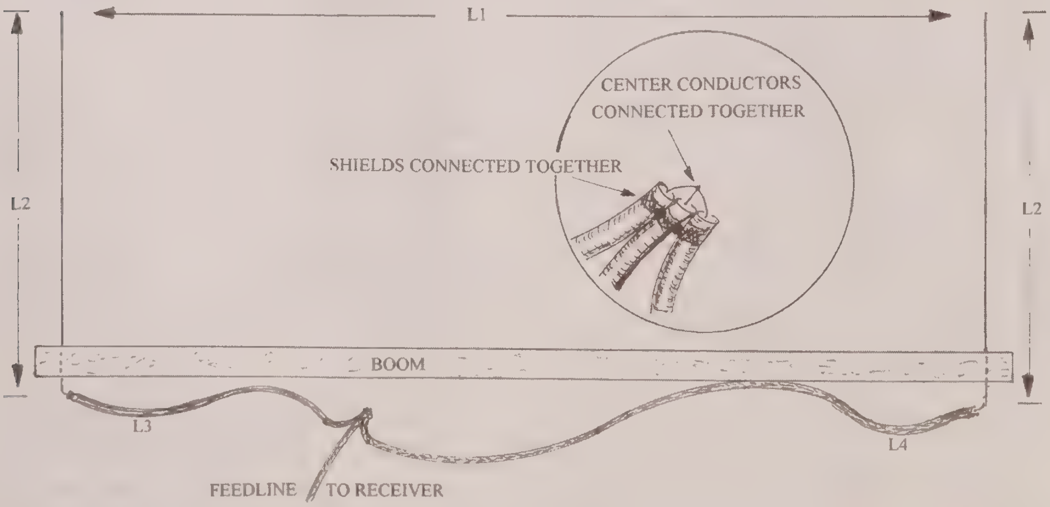
L1
CENTER CONDUCTORS CONNECTED TOGETHER
SHIELDS CONNECTED TOGETHER
L2
L2
BOOM
L3
L4
FEEDLINE
TO RECEIVER

Fig 1. A phased array useful for RDF work. When connecting feed line and phasing lines, connect all shields together and all center conductors together as shown in the inset. At the vertical elements, only the center conductor of the phasing line is connected.

Homing antennas function by electronically switching rapidly between two antenna elements, and processing the resulting signals to give a precise direction indication. These systems can use meters or LEDs to tell you which way to turn to find the direction to the fox. Doppler RDF systems, which are even more electronically sophisticated than the homing antennas, actually give you the bearing to the fox. Both homing antennas and Doppler systems are relatively expensive, especially the Dopplers. But the good news is that you can save a considerable amount of money by building your own. *Transmitter Hunting: Radio Direction Finding Simplified* (TAB books) by Joseph D. Moell (K0OV), and Thomas N. Curlee (WB6UZZ) covers every aspect of building and using a variety of RDF antennas. The *ARRL Antenna Book* also contains information on RDF and construction of RDF antennas as does *Carr's Practical Antenna Handbook*, 3rd and 4th editions, (TAB Books).

❖ RDF Without a Special Antenna

If you hold a handheld receiver using a rubber duck antenna up against your body's midsection and turn on your heels in a circle you should notice that the signal you are receiving will fade to a minimum level at some time during your rotation. When you are turned for minimum signal your body is shielding the receiver's antenna from the fox, and you are facing directly away from the direction of the fox.

If the above body-shield technique doesn't work, you may be close to the fox, and the signal therefore very strong. Then it may be necessary to reduce the amount of signal to your receiver. Attenuators are useful for this. Another approach to signal-strength reduction is to use a very short length of wire for the receiving antenna, or even remove the antenna completely. Yet another easy way to obtain directivity is to put your handheld receiver in a tall metal can. Then point the can around in different directions: the can opening will be pointing toward the fox when the signal is loudest, and away from the fox when the signal is weakest.

❖ Let's Make an RDF Antenna

Two vertical elements fed in the correct phase relationship (fig. 1) can produce an antenna with a null which is useful for RDF work. This beam is usually designed for use at VHF. To make this beam you can use lengths of thin tubing as the

This Month's Interesting Antenna-Related Web site:

Joseph Moell's site is filled with pertinent news and information, plans for RDF antennas, and techniques for using them:
http://members.aol.com/homingin/
For information on underwater radio reception as discussed in this column's Radio Riddles check out: **http://webhome.idirect.com/~jproc/radiostor/vlfelf.html**

vertical elements. Number 12 copper house wiring wire won't stand straight as an arrow, but it will work. You can try varying the distance along the boom between the vertical elements to see where you get the best null. Use polyethylene-insulated (not foam) coax.

For dimension length in inches:

L1 (element spacing, a quarter wavelength in air)=2952/frequency in MHz
L2 (element length , a quarter wavelength in wire)=2808/frequency in MHz
L3 (a quarter wavelength in polyethylene-insulated coax)=1948/frequency in MHz
L4 (a half wavelength in polyethylene-insulated coax)=2 X L2

For example, at 100 MHz L1 would be 29.5 in, L2 would be 28.1 in, L3 would be 19.5 in, and L4 would be 39 in.

The boom is made of an insulator such as dry wood or PVC pipe. The antenna can be handheld above your head by the boom for taking bearings. If you use this antenna from a vehicle you will need to add a mast to hold the boom well above the vehicle's roof.

❖ Using the Antenna

When you orient the antenna for the least signal (best null), then the L4 end of the beam is pointing toward the signal source. You could follow this bearing line toward the signal source or draw a line with this same bearing on a map of your location. Then travel a good distance perpendicular to that bearing, and take another directional reading. This gives a second bearing line for your map. The signal source is at the point where the lines cross.

In our practical world, RDF is often not as easy as it sounds because of false readings due to reflections from nearby or even distant surfaces. When using the antenna in a vehicle, the pattern may be different than when out in the clear. Before you rely on the antenna for directional readings, practice with it in the same sort of environment in which you will be using it.

RADIO RIDDLES

Last Month:

I asked: "If RF is dissipated in the earth and water as heat, then why is it that underground antennas are sometimes used with good results, and even submerged submarines can receive radio signals?"

Well, it's true that there is an impedance mismatch, and partial reflection of the signal at the interface between the air and the earth or sea water. But some signal does enter the water or earth and propagate therein. Not all of this signal is immediately dissipated as heat: some is available for reception.

The longer wavelengths utilized for communication with submerged submarines penetrate the earth and water better than shorter waves. At the lower frequencies (i.e., VLF, ELF or lower!) used for this work, reception quality is determined more by signal-to-noise ratio than by simple signal strength. Thus, world-wide reception is possible with underwater or underground antennas when very high power levels are used at the transmitter along with those low frequencies of operation.

At moderate transmitter-power levels, underwater and underground antennas placed only inches below the earth's surface can be used with success for shorter distance communication even into the HF band.

This Month:

Let's say that a radio operator was operating an RDF system at the North Pole. She took a direction bearing on a signal coming from an amateur radio transmitter in Des Moines, Iowa, USA, and another bearing on a shortwave broadcast signal coming from Berne, Switzerland. From what compass directions did each of these signals come?

You'll find another riddle, another antenna-related web site or so, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

1273.025 MHz
12.5 kHz
10
15
WiNRADiO

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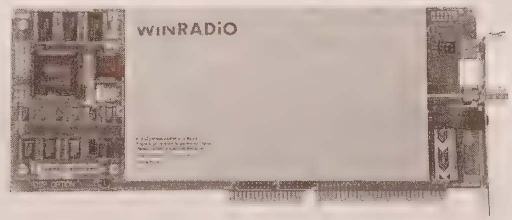

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RADIO RESTORATIONS

BRINGING OLD RADIOS BACK TO LIFE

Marc Ellis
marcellis@monitoringtimes.com

Our Next Project: The Hallicrafters S-40A

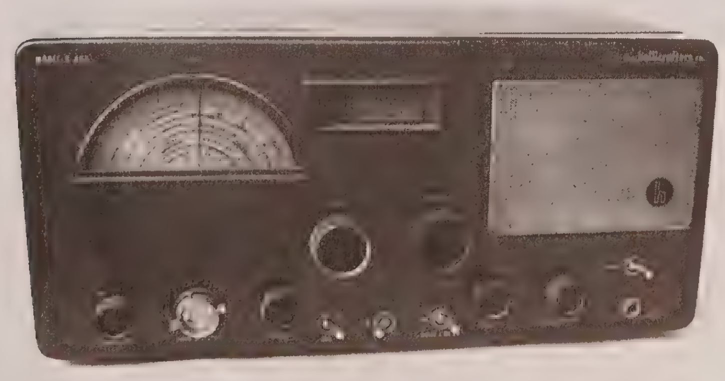
Zenith Postscript

We finished the restoration of the Zenith 6S229 "black dial" radio in the last issue. But at that time I still hadn't had a chance to hook up the set to an outside antenna and put it through its paces. I just finished doing that this afternoon, and heard a very satisfying number of signals all over the broadcast band. The tone quality was devoid of highs but very mellow and smooth nonetheless – just what we would expect from a nice '30s receiver. Though I would have heard more in the evening, I did pick up enough signals on the shortwave bands to assure me that the radio was working properly.

❖ Radios for the Postwar Utopia

Are you old enough to remember the era that began with the close of World War II? If so, you'll certainly recall the wonders that were promised to post-war consumers just as soon as our country's industrial complex could gear up once more for civilian production. The popular press tantalized us with images of personal commuter planes neatly parked on tract house lawns, robot housekeepers, phones that transmitted pictures as well as voices and much more.

Although reality never quite caught up with the hype we were reading, the excitement and optimism of the mid 1940s was reflected in the overhauled appearance of many familiar objects that previously had looked unabashedly utilitarian. The new product images were created by members of the emerging industrial design profession, and Raymond Loewy was among the best known of these. He developed new looks for Pennsylvania Railroad locomotives, Studebaker automobiles, Greyhound buses, the Coke and Shell Oil logos ... and the Hallicrafters line of SWL and ham radio receivers.



S-40A front panel is in decent shape but needs freshening up. Trim ring is present on tuning knob (left, center), but missing on matching bandspread knob.

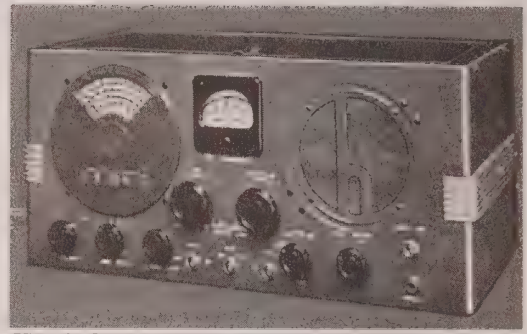
Bill Halligan, the firm's owner, certainly seemed to have that utopian postwar vision firmly in mind. Though he was definitely still focused on creating receivers for hams and SWLs, Halligan also pursued the idea of making his products at home in the living room – so that every American family could enjoy world-wide reception at the touch of a dial. He retained Loewy to create the appropriate designs.

The resulting sleek new radios included the 6-tube S-38, a low-cost SWL receiver (essentially a cosmetic redesign of the prewar S-41); the S-40, a 9-tube, medium priced starter ham receiver (based electronically on the pre-war S-20R "Sky Champion"); and the elegant, 15-tube SX-42, which, in addition to serving as a very serious communications receiver, could also double as a living-room FM radio. Everything from the arrangement, appearance and labeling of the controls to the sharp cabinet colors to the softly-lit apple-green tuning dials, proclaimed that these were radios designed to serve in our brave new postwar world.

In 1946-47, when the S-40 came out, I was a high-school freshman with a strong interest in amateur radio, but, as yet, with no equipment and no license. Almost every Saturday I'd take the bus and subway to downtown Boston, where I'd meet a good friend with similar interests. We'd spend a lot of time in Lafayette Radio's ham equipment display room. Now long gone, the firm was otherwise known by the ponderous name of "Radio, Wire, Television, Inc." The atmosphere was a cross between a jewelry shop and automobile showroom. The delectable ham goodies were spotlighted on carpeted display fixtures in a hushed atmosphere.

I had a little over a hundred bucks, accumulated by doing odd jobs, and permission to spend this money on a ham receiver that would allow me to begin preparing for my ham license by receiving code signals. Since the S-40 was so cool looking and also so attainable (price: $79.50), I spent a lot of time looking at it. Even today, the sight of a nice S-40 or a vintage ad for one makes me brighten up a bit.

As it happens, I didn't get the S-40. My friend's ham dad, who was advising me, recommended instead an army surplus BC-312 receiver – a set with very different, but just as endearing, qualities. It was a lot more receiver for just a little more money – though its looks were anything but Loewy-sleek. That's a story for another time, however!



Here's the prewar Hallicrafters S-20R Sky Champion, which is essentially the S-40 before Raymond Loewy got his hands on it. Which version do you like better?

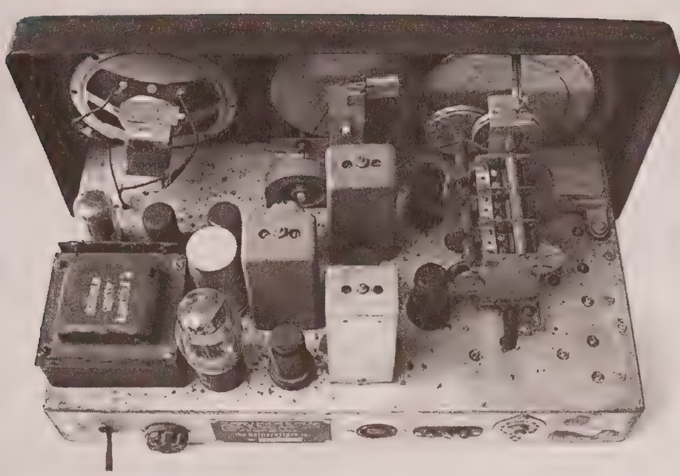
❖ The S-40 and Variations

The original S-40 was released early in 1946. At $79.50 it didn't cost too much more than a family style 6-tube broadcast/shortwave table model in a nice furniture cabinet. But the 9-tube S-40 was actually a respectable communications receiver. Instead of a broadcast band and a nominal shortwave band or two, its coverage was continuous from the bottom of the broadcast band up through 44 MHz (divided into four bands). It had a stage of r.f. amplification, where most family sets had none, and two stages of i.f. amplification, where most family sets had one.

Add the adjustable bfo for cw reception, noise limiter, bandspread tuning, avc disable switch, headphone jack and provision for a doublet antenna, and you had a piece of equipment that would provide an amazing amount of serious listening pleasure even if it never became incorporated into a ham station. The whole works was housed in a heavy-gauge metal grey-black cabinet with a fully-perforated wraparound top. The latter could be raised on its piano hinge to give unhampered access to the interior.

Control labels are silk-screened in white, except for the default positions for ordinary broadcast-band listening. Quoting from a 1947 Hallicrafters ad ". . .the normal positions for standard broadcast reception are marked in red, making it easy for the whole family to use this fine receiver." The built-in speaker has a perforated, anodized-aluminum front-panel grill that contrasts nicely with the grey-black cabinet color. The grill carries the famous lower-case "h" Hallicrafters logo, in silver and black, at the lower right-hand corner.

As originally released in early 1946, the S-40 used a 6SG7 r.f. amplifier, 6SA7 oscillator/mixer,



Chassis of the S-40A is dotted with rust spots. Power transformer is not original.

two 6SK7 i.f. amplifiers, a 6H6 noise limiter/ AVC tube, 6SQ7 detector/first audio, 6F6 second audio, 6J5 BFO oscillator and 80 rectifier.

In March, 1947, the S-40 was supplanted by the S-40A, which was virtually the same radio except that the venerable 80 rectifier was replaced by a 5Y3. At least that's what the books tell us. My S-40A has an 80 rectifier, so I'm not sure what makes it electronically different from a plain S-40. The last iteration of this radio, the S-40B, appeared in August, 1950. In the S-40B, the 6J5 and 6SQ7 were replaced by a 6SL7 dual triode, allowing reduction of the tube complement by one.

Some cabinet changes were also made in the S-40B. The anodized-aluminum speaker grille, which is a separate, riveted-in piece in the S-40 and S-40A, was now stamped into the front-panel itself and painted black like the rest of the panel. The "h" logo was dropped. The hinged cover lost the system of fine perforated holes on its top and sides, replaced by a few horizontal vents stamped into each side.

I happen to have one of each of the S-40 variations. My first-generation S-40 is beyond saving by ordinary restoration procedures. Presented to me by a friend who saw no hope for it, the set had been abandoned on the porch of a summer cottage for many years and is badly rusted. It should be a great parts source, if needed, for my S-40A – which will be the subject of this restoration. I picked the latter over the newer S-40B, because the "A" is essentially the same as the S-40 I had spent so much time looking at as a teen-ager.

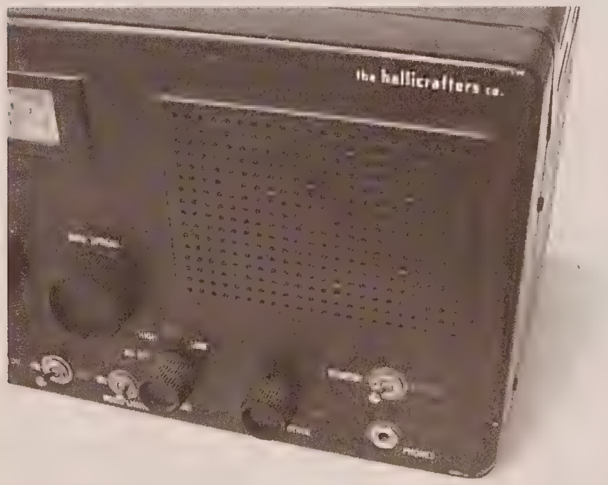
If you take a liking to this family of Hallicrafters radios, all three of the models turn up frequently at radio meets and, with very minor exceptions, the restoration procedures I'll be going through will apply to all models.

❖ Taking Stock

The S-40A's cabinet is in pretty good shape, with no dents and bumps. The paint is a little dull with some minor abrasions here and there. There are some unfortunate plier scrapes around the retaining nut for the AVC switch, suggesting a careless repair. The speaker grille is a little yellowed and stained. The line cord is brittle with age and will have to go. One of the rubber feet is missing from the bottom of the chassis and the decorative metal trim ring has disappeared from the bandspread tuning knob.

Raising the cover, I noticed there were factory-punched holes for latch hardware that had never been installed. My S-40B actually has the latches; my S-40 doesn't even have the holes. There are corrosion spots all over the anodized finish of the chassis, and I see a coat of metallic aluminum paint in its future – provided I can find a neat way to mask the tube number designations. Absent on this chassis are a number of unused holes, perhaps 1/2" in diameter, that are present on the S-40 chassis.

The power transformer looked suspicious. It has some mounting brackets that are not being used and would likely not be present in a unit engineered especially for the set. It is a little more hefty than the ones in my S-40 or S-40B and bears what looks like a Stancor replacement part number rather than the Hallicrafters designation found in the parts list. The speaker looks original but one of its leads has been cut, then spliced and taped. Some crude troubleshooting effort, I suppose. The output transformer is apparently mounted under the chassis, while on the S-40 it is mounted right on the speaker frame.



Speaker grille of the S-40B is not a separate piece as in the earlier versions, but is formed from the metal of the panel itself. The "h" logo has been eliminated.

Removing seven screws from around the periphery of the wraparound front panel made it possible for me to slide the cabinet backwards off the chassis/ panel assembly. The first thing I inspected was the power transformer and my suspicions were confirmed. The metal around the transformer opening and mounting screw holes had been filed here and there to allow the installation of this larger unit.

Unless its voltages are within factory specs, I'll probably want to replace it with an original from my "cottage front porch" S-40. I hope that transformer will be large enough to cover the file work that had been done on the S-40A chassis.

Giving the wiring a quick once-over, I didn't notice signs of any severe tampering or electrical catastrophe, though a couple of the paper capacitors had been replaced with modern units (possibly one of the originals had shorted and taken the transformer with it). Another paper capacitor had been disconnected, probably for testing, and never reconnected. Surprisingly, the original electrolytic was still in the circuit. A couple of the power resistors were quite darkened, but this could easily have been due to normal heating rather than overload.

A strange, non-original length of hookup wire had been poked into the can of the bfo coil and wired between ground and the cathode of one of the 6SK7 i.f. tubes. Makes no sense right now, but perhaps the bfo coil burned out in the same incident that took away the power transformer and this was a crude workaround. Makes me very glad that I have the rusted-out S-40 (which looks quite untouched under the chassis) as both a parts source and a reference to the original wiring.

Normally, in a preliminary once-over like this one, I would take out the rectifier tube – effectively removing high-voltage from the circuit – plug in the set, and test the transformer windings for proper voltages. I don't like to get involved in working on a set with a bum transformer because it's difficult to find proper replacements. Such a test is obviously moot right now.

All in all, it looks as if this unit will make quite an interesting restoration challenge. We'll begin work next time!

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Uniden BC785D Scanner

The Uniden BC785D is a tabletop scanner which can follow conversations in conventional and several different types of trunked systems. An AC operated wall wart power supply is included. A fully lit keypad and mounting bracket make the BC785D well suited for mobile use, too.

The BC785D's feature set compares with the Uniden's BC250D handheld model (see May *MT*). Both radios include wide frequency coverage and the ability to demodulate APCO P-25 digital voice signals when equipped with the optional BCi 25D card.

We cannot possibly cover all the BC785D's features in this column, so we recommend you download an electronic copy of the owner's manual from the Support section at **http://uniden.com**. With no APCO systems in my locale, I am unable to review the optional BCi 25D digital card, but you can read the report on page 88.

The BC785D and BC250D cover 25 - 512, 806 - 956 (minus cellular phone), and 1240 - 1300 MHz. There are frequency gaps at 512 - 806 and 956 - 1230 MHz.

There are seven choices of step size available, plus an AUTO setting, the latter being determined by frequency. Steps of 6.25 and 8.33 kHz are not available.

Both radio-to-radio cloning and computer control are supported. The interface protocol is not documented in the owner's manual and Uniden has been refusing requests for the information.

❖ Memory

The BC785D's 1000 memory channels are organized into 10 banks of 100 channels each. Each conventional channel may be programmed with: a frequency and mode (AM, FM, WFM, NFM), a 16 character label, step size, rescan delay on/off, lockout, attenuator on/off, CTCSS or DCS tone squelch, and beep alert.

❖ Trunked Systems

There are a wide variety of trunked systems in use, and the BC785D is designed to track conversations in these systems: Motorola Types 1, 2 (VHF, 400, 800, and 900 MHz), EDACS (Wide band 9600 baud, Narrow 4800 baud, and SCAT), and LTR. SCAT means Single Channel Autonomous Trunking and is an EDACS configuration in which a single frequency serves as both as a control and voice channel.

You can track up to 10 different trunked systems, one per bank. The BC785D offers memories for up to 100 talk groups per trunked system, in 10 subgroups of 10 IDs each. Talk group IDs may be programmed directly using the keypad or stored while receiving signals on the talk group of interest.

A descriptive label can be programmed for each talk group, as well.

As with the earlier Uniden BC245XLT and BC780XLT, EDACS and LTR frequencies must be programmed into memory channels in the proper sequence.

The BC785D can demodulate APCO 25 digital voice on conventional and trunked systems when the optional digital card is plugged into a trap door on the rear panel.

❖ Searching

Ten pairs of frequencies may be programmed for limit searching. Limit search banks may be "chained" or linked together to search multiple ranges in succession. Up to 200 frequencies may be skipped during a limit search.

Scanner enthusiasts have prized the Auto Store feature since it was first offered in the 1976 vintage Bearcat BC-250. Uniden carries forward the tradition of providing an Auto Store facility in the BC785D. Auto Store permits unique, active frequencies found during a limit search to be stored automatically in a selected bank.

TRUNKTRACKER III
BC785D
digital ready
Uniden
1000
CHANNEL
1
2
3
4
5
6
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.
0
E

❖ Construction

The BC785D's liquid crystal display is a dot matrix, i.e., composed entirely of small dots. There are menu options for two brightness levels and off.

Missing from the BC785D's display are indicators for Data Skip, Tone Squelch, Attenuator, and Rescan Delay, so you cannot tell at a glance whether these options are enabled or disabled on a particular channel. That's a problem, because the data skip, attenuator, and delay settings are vital information. Hiding them has led some owners to believe their scanner is insensitive or resuming scan prematurely because they were unaware of the settings.

To view a channel's configuration, push and hold the Menu/Back key for a couple of seconds. You can then see the channel settings, but you must scroll through them because the screen shows only three settings at a time.

The keypad is backlit, which makes it easy to use the BC785D in a dark car.

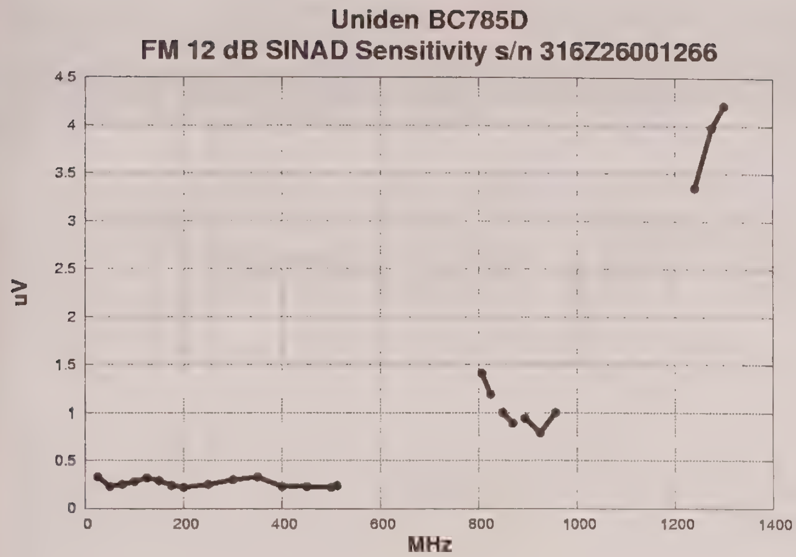
❖ Usability

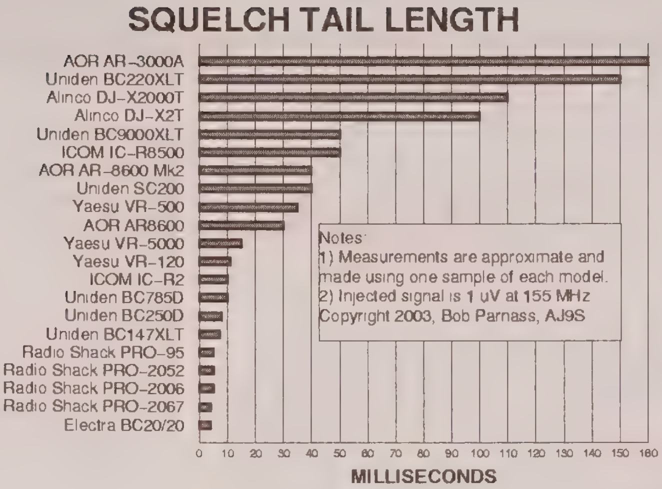
You can program conventional memory channel frequencies using one of two procedures: (1) By positioning to the desired channel, then typing in the frequency followed by pressing the E key, or (2) Navigating the menu system.

The simpler, direct method works, but only for frequencies which coincide with the default step size. For example, the default step size is 50 kHz in the 225 - 399.95 MHz military air band.

If you enter 335.525 MHz directly, the BC250D will coerce the frequency to 335.55. You can then use the menu system to "drill down" to the STEP submenu, change the step size to 25 kHz, then re-enter the 335.525 frequency. Now, the BC785D will accept the frequency without rounding.

You can program alphanumeric labels for individual memory channels, channel banks, limit banks, and talk groups. If a talk group becomes active while searching for new talk groups, the ID will be displayed instead of the label you may have programmed. This is different from the older BC780XLT and PRO-2067 and makes it more difficult to distinguish "new hits" from previously programmed talk groups.





❖ Performance

Our BC785D (s/n 316Z26001266) has ample audio, though the internal speaker provides a somewhat muffled sound. As expected, better fidelity may be obtained by using a good external speaker pointed at the user's ear.

Measurements

Uniden BC785D Scanner
S/N 316Z26001266

Uniden America Corp.
4700 Amon Carter Blvd.
Fort Worth, TX 76155
tel. (800) 554-3988
http://www.uniden.com

Frequency coverage (MHz):
25 - 512
806 - 823.9875
849.0125 - 868.9875
894.0125 - 956
1240 - 1300

Step sizes (kHz):
5, 7.5, 10, 12.5, 25, 50, and 100, AUTO

Modes: AM, WFM, FM, NFM, user selectable

NFM modulation acceptance: 12 kHz

Audio output power at extenal speaker jack: 2 watts @ 10% distortion

Attenuator:
5 dB @ 40 MHz
3 dB @ 155 MHz
26 dB @ 460 MHz
21 dB @ 860 MHz

IFs (approx., in MHz):
380/242, 45/10.8, 0.450

Image Rejection Due to 1st IF:
39 dB @ 40 MHz
49 dB @ 155 MHz
94 dB @ 460 MHz
67 dB @ 860 MHz

Squelch tail near threshhold (1 uV @ 155 MHz): 10 ms.

Practical memory scan speed: varies, depending on memory contents (see text)

We experienced some intermod on the VHF-high band where public safety transmissions are sometimes mixed with a 162.4 MHz NWR (National Weather Radio) transmission. The NWR transmitter interferes with many of our other scanners, except the "bulletproof" ICOM IC-R8500.

Like the BC250D, our BC785D's memory scan speed varies, depending on what's programmed in the memory channels. We programmed 25 channels with our usual variety of frequencies and (conventional) modes and measured a scan speed of 25 ch/sec. Program the memory channels within each bank in order of frequency if you want faster scanning.

Some of the earlier model Uniden scanners, e.g, BC895XLT and BC9000XLT, featured TurboScan, and sped up the scan rate by sorting the frequencies before scanning. The BC250D and BC785D scan memory channels in channel number order and we didn't find a keystroke combination to scan them by frequency.

We measured a search speed of 87 steps/sec. with a 12.5 kHz step size.

The squelch action in the BC780XLT (s/n 06000019) we tested in March 2001 was sloppy. The squelch threshhold varied with frequency and mode. There was a high amount of hysteresis and a large amount of "play" in the squelch control.

Our BC785D squelch action has improved significantly, though it still has too much hysteresis. The squelch threshhold settings differ by band and mode, though the differences are not as pronounced as our sample BC780XLT.

❖ Overall

Multiple system trunk tracking, digital demodulation capability, military air band coverage, CTCSS and digital tone squelch, alpha labels, and a computer control interface make the BC785D the "scanner enthusiast's scanner."

The closest competition is the earlier BC780XLT model. Improvements over the BC780XLT include APCO 25 digital trunk tracking, an extra 500 channels, and better squelch action.

Aside from those advantages, BC780XLT owners have little to gain by ditching their radios for a BC785D. The older BC780XLT strengths include talk group labels which are visible while searching and more status indicators on the display.

The Uniden BC785XLT is $369.96 (plus $299.95 for the optional digital card) from Grove Enterprises: call 1-800-438-8155 or visit http://www.grove-ent.com

---

NOTICE: It is unlawful to buy cellular-capable scanners in the United States made after 1993, or modified for cellular coverage, unless you are an authorized government agency, cellular service provider, or engineering/service company engaged in cellular technology.

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- Ni-MH Battery
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- Menu system
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John Catalano, PhD
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Decoding RTTY, NAVTEX, and More

Clicking around the Internet is one of my favorite relaxation therapies. To me, the idea of digging into the seemingly never-ending pages of new radio products and software is like going treasure hunting. You never know where you may find the treasures – on new sites or updates to sites you just looked at yesterday! The programs we'll look at this time are actually all from the same website – **http://www.dxsoft.com**. Most of these programs are not free (cost ranges from $35 to $49); however, all are available as free "limited operation" downloadable files.

Although most of the programs are squarely aimed at the ham radio community, I found a number of them quite useful to radio monitors.

❖ SeaTTY

SeaTTY version 1.10 is a program that decodes RTTY signal from hams, aviation and nautical weather, military, press and other utility stations. In addition, SeaTTY decodes the NAVTEX weather forecasts effortlessly. (See p.71 - ed.)

What equipment do you need to use SeaTTY? Not much!

It Runs on an Abacus

Not quite, but almost by today's computer standards. All that is required is a very, very simple and inexpensive AMD 5x86-133 or Pentium-75 computer with a sound card. The sound card should support "mono - 16 bits - 11025 Hz" mode. To download the program on this computer you will also need a modem. If you check flea markets you can easily find computers that fill the bill for under $50. I recently bought just such a computer for $5 at a local hospital fair.

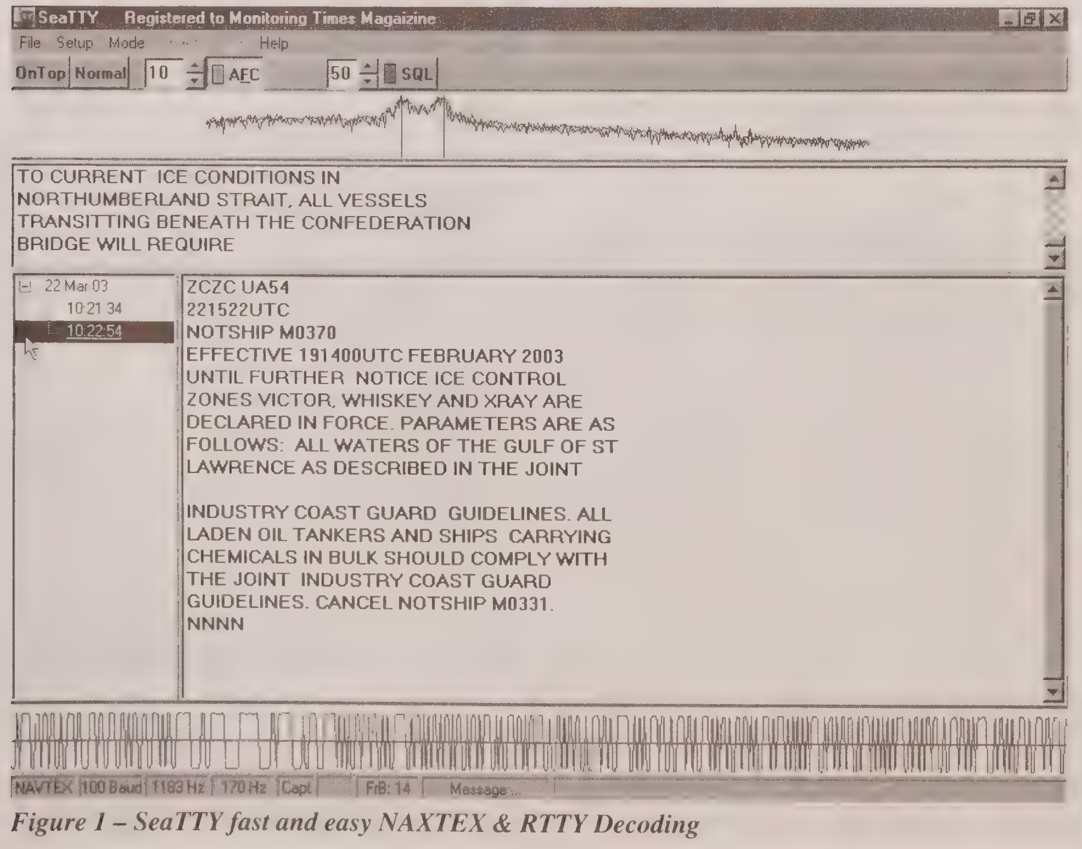
For this review SeaTTY was run on a Pentium-233. The 1 MEG program was downloaded as a zip file. It was then unzipped and installed using WinZip 8.1 without a problem. From beginning of download, using a dial-up connection, to installation and operation took less than ten minutes.

What Decoder Box?

No hardware decoder is required. The only connection that is required is between the receiver's audio output, or earphone, and the computer's sound card audio input.

"Seaing" SeaTTY in Action

Figure 1 shows the program decoding a NAVTEX signal around 517 kHz. The receiver's audio signal is displayed in the graph near the top of the screen. You can see the two "bumps (peaks)" which are the two tones of the NAVTEX signal. All the user needs to do is to point the cursor at a location between the two peaks. With a click of the mouse the program's filters align themselves with the tones. The two vertical lines, which sit on the peaks, indicate that this process has been performed and SeaTTY is ready to decode.



```
10  AFC   50  SQL
```

```
TO CURRENT  ICE CONDITIONS IN
NORTHUMBERLAND STRAIT. ALL VESSELS
TRANSITTING BENEATH THE CONFEDERATION
BRIDGE WILL REQUIRE
```

```
ZCZC UA54
221522UTC
NOTSHIP M0370
EFFECTIVE 191400UTC FEBRUARY 2003
UNTIL FURTHER  NOTICE ICE CONTROL
ZONES VICTOR, WHISKEY AND XRAY ARE
DECLARED IN FORCE. PARAMETERS ARE AS
FOLLOWS:  ALL WATERS OF THE GULF OF ST
LAWRENCE AS DESCRIBED IN THE JOINT

INDUSTRY COAST GUARD  GUIDELINES. ALL
LADEN OIL TANKERS AND SHIPS  CARRYING
CHEMICALS IN BULK SHOULD COMPLY WITH
THE JOINT  INDUSTRY COAST GUARD
GUIDELINES. CANCEL NOTSHIP M0331.
NNNN
```

```
NAVTEX | 100 Baud | 1183 Hz | 170 Hz | Capt |  | FrB: 14 | Message...
```

Figure 1 – SeaTTY fast and easy NAXTEX & RTTY Decoding

The Results

The area directly below the top graph is where the real-time decoded message appears. In Figure 1 you can see that this message discusses "ice conditions." This message has not been completed, as yet. However, when SeaTTY senses that a message has been completed, it then files it by date and time. Look at the long vertical box below and to the left of the Message area. Here you can see the file names of previously received messages.

Clicking on a file name will retrieve the previously decoded and stored message. In Figure 1, the message received at 10:22:54 has been selected and is displayed in the box to the right. This message concerns the Gulf of St. Lawrence.

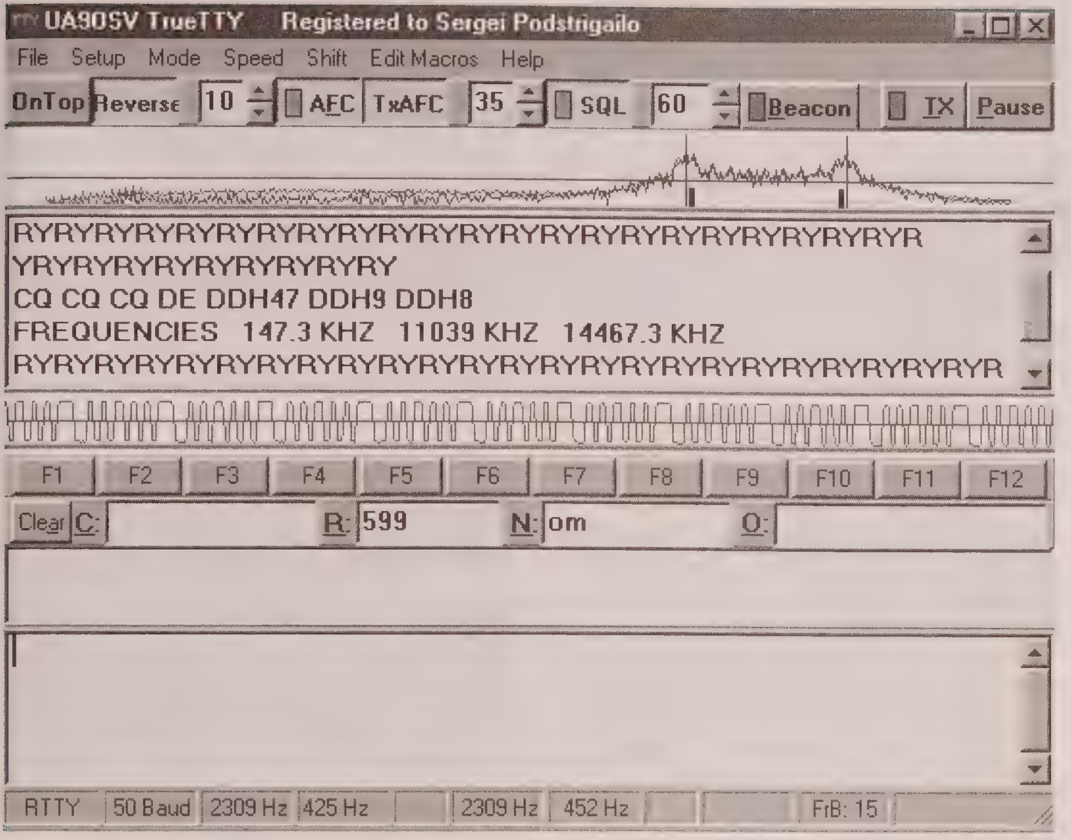
This automatic file naming by time and saving is perfect for unattended monitoring. It works great. NAVTEX monitoring has never been easier!

The Bottom Line

Looking at the graph at the bottom of Figure 1 shows the "clean" stream of decoded data. Below the output graph is the status line where you can see program setting: Mode (NAVTEX), Speed (100 Baud), Audio frequency (1183 Hz), Shift – difference in frequency between the two tones (170 Hz), Message Capture (Capt.) and Free Buffers (14).

More Features

Now that we have gone through SeaTTY's basic operation we should look at its added features. Most settings are selected via the traditional command line dropdown menus at the top of the screen. However, the line below the Command line allows the user to access some interesting features. The first two "buttons" are pretty self-explanatory. "OnTop" keeps the SeaTTY screen on top of


UA9OSV TrueTTY Registered to Sergei Podstrigailo
File Setup Mode Speed Shift Edit Macros Help
OnTop Reverse 10 AFC TxAFC 35 SQL 60 Beacon TX Pause
F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12
Clear C: R: 599 N: om O:
RTTY 50 Baud 2309 Hz 425 Hz 2309 Hz 452 Hz FrB: 15

```
RYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYR
YRYRYRYRYRYRYRYRYRYRY
CQ CQ CQ DE DDH47 DDH9 DDH8
FREQUENCIES  147.3 KHZ  11039 KHZ  14467.3 KHZ
RYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYR
```

Figure 2 – TrueTTY ...Like SeaTTY on Steroids!

all other running programs. "Normal" allows the user to select which of the two tones is the "high" data pulse. When clicked it goes to "Inverse." Which setting is the right for a signal is dependent on your receiver settings (USB or LSB) and the station's transmission.

More interesting is the next group of buttons. The next two buttons work together to keep the program's tone filters on the signal. With "AFC" selected the *A*utomatic *F*requency *C*ontrol feature makes the program filters "track" as your receiver's frequency drifts. It's interesting to watch the two lines in the top graph making constant small movements around the tone peaks. The number to the left of "AFC" is where the user can set the speed at which the frequency corrections are made by the program.

Silence Is Golden

The next two buttons are used in noisy signal environments. Selecting the Squelch (SQL) function makes the program only react to signal levels above a set level. Junk letters are prevented from being displayed. The squelch level is set by the user in the box to the left of the SQL box.

Decoding RTTY

When the RTTY mode is selected from the top Command line the Shift and Speed menus become active. This mode worked great decoding Ham and Press signals. Because of the large number of RTTY signals on shortwave that are now encrypted, signals from military and government stations can be decoded but cannot be read. But that's not SeaTTY's fault.

SeaTTY Wrap-up

SeaTTY 1.10 works great. The only thing I found a bit tricky is the very noticeable delay and program freeze when selecting menu items in the command line. It seems that it was more noticeable when going from higher speeds and shifts to lower. In fact the delay was so long I thought the program had stopped responding. This is a minor inconvenience when using this well-behaved and very well designed program. The full version of SeaTTY costs $35.

❖ SeaTTY's Big Brother

SeaTTY version 1.10 worked great for decoding RTTY and NAVTEX, but what about decoding other modes? Enter TrueTTY version 2.01.

TrueTTY's supported modes are "RTTY (Baudot code), ASCII (7 or 8 bits), PSK31 (BPSK and QPSK), AMTOR-FEC (SITOR-B, NAVTEX), MultiFSK-16. HF-PACKET and UHF-PACKET (AX25) are supported in KISS-TNC emulation mode. SELFEC SITOR and DTMF-code decoding is also possible." Figure 2 is a screen from the program's Help file.

As you would expect, TrueTTY works very similarly to SeaTTY but has the added modes plus capability of being able to transmit these modes. Transmission is accomplished via the soundcard output. However, although interesting, these transmit features are wasted on non-ham monitoring folk. But the expanded decode modes make this program a necessity for most of us and well worth the $49 price tag.

❖ What Other Treasures?

There are a number of other programs available on the dxsoft.com website. **CwGet** is a program to decode Morse code (CW) to text via a sound card. **AALog** is a very nice logging program with all kinds of features, but its log is formatted for use by hams.

Free of charge, full-feature programs are available at dxsoft.com. These include Switcher, Hamport and Cwtype.

Switcher is software to handle devices connected to an LPT port; for example, printer, WebCam or image scanner. Nice concept, but be careful if you use a parallel port Zip drive. Running Switcher made my Zip Drive "Inaccessible." I'm still working on the problem.

Cwtype converts your computer into a Morse code generator. Press a letter and you'll hear the corresponding dots and dashes coming from your computer's speakers.

Hamport is a nice little radio control program. Unfortunately, it only works with ICOM, Kenwood and Yaesu ham *transceivers*, not receivers. What a shame! Are the makers of Hamport listening?

❖ On to the Next Site

If you have a radio program "Treasure" that you would like to share with all of us, email me the website, name of the download and what it does in your radio shack. Till next time and the turning of a new season.

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MT REVIEW

Ten-Tec RX-320

By Lee Reynolds

Radio technology has steadily changed over the decades. From tubes and hand-wired tag strips at the start, we've moved to transistors mounted on printed circuit boards, then on to today's mix of compact integrated circuits (ICs) and Surface Mount Devices (SMDs). We're a long way from the heyday of solid, squat Collins, Hammarlund and Eddystone radios with their gently glowing tubes, analog (or mechanical-digital) dials and polished knobs.

One of the newer kids to show up on the radio block in the last decade and a half is the technique of digital signal processing (DSP) – using ICs (really, special purpose computers on a chip) that take a radio signal, digitize it, and then manipulate the digitized radio signal according to whatever the software instructions tell it to do. What used to be done in analog mode with crystal filters or networks of inductors and capacitors, can now be achieved by a chip or two and some software.

Of some significance is the fact that software tells the hardware what to do: Tell a chip (via software) to think that it's a 1.8 kHz SSB filter and it will. Change the software, tell the filter it's now a 6 kHz AM filter, and it behaves accordingly. This will eventually lead in the next decade or so to radios that will change their abilities completely with a push of a button.

In the meantime, we're seeing DSP processing show up in a number of our radio toys, and the manufacturers of said toys are also realizing that computers make very nice "radio control panels."

Okay, a riddle for all you shortwave enthusiasts out there – what is black and rectangular? Smaller than a breadbox? Is deserving of great fame? Has more faces than a Louisiana Congressman confronted by PAC money, yet (unlike the Congresscritter) gives good value for money to the public?

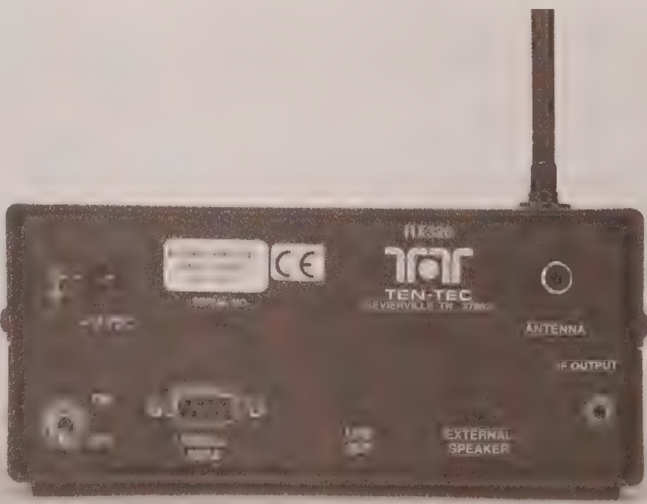
If you said "RX-320" then I'm already preaching to the choir. If, on the other hand, you said "Hunh?" or "RX-320 – isn't that something for Athlete's foot?" then you should read on…

❖ Ten-Tec's Tricky Black Box

Ten-Tec in Sevierville, Tennessee, is known to radio buffs for their ability making military, commercial and amateur-grade radios using DSP techniques. They've extended that knowledge and manufacturing capability into pricing territory formerly occupied only by the higher end, portable, analog, shortwave radios and have produced the RX-320 – a compact 'black box' radio that has no knobs, no lights and only a power switch and a few connectors on the back panel. Sounds plain? You betcha it does…until you combine it with the PC that it was designed to operate with. All of a sudden it turns into a PC/radio hybrid that offers the best of both worlds. Let me explain further –

The RX-320 is designed to be a shortwave receiver covering 100kHz to 30MHz, AM, LSB, USB and CW. Instead of having a regular control panel, it has a serial connection for a PC to talk to, and control software that is run upon that PC. Sensitivity figures are good at about .3uv for 10dB S/N ratio; stability is more than sufficient to handle today's digital modes; and the radio offers up to 34 IF bandwidths.

When you order the RX-320 you receive the unassuming black box itself, a wall transformer to power it (15 VDC), a telescopic whip antenna that screws into the top of the radio (you can use an external antenna as well), the interface software, a male to female DB9 straight-through cable to connect the radio to your PC, a 30 page manual, and an audio patch cable to route the '320's audio into your PC's sound card, headphones or an external speaker (if you choose not to play the '320 back through your system's speakers).



There's a lot of power hiding in this little black box... power unleasher when you make the connection between the rear of the RX-320 and your computer.

❖ Installation

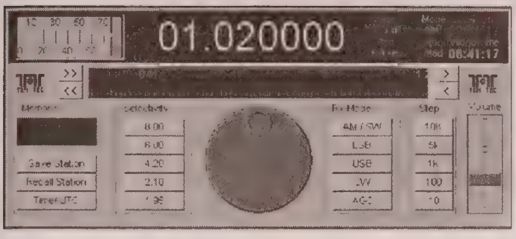
Plug in the wall transformer, connect the serial cable between the PC and the '320, connect the antenna or screw in the whip and, for simplicity's sake, connect a speaker or headphones to the *External Speaker* jack on the back of the radio. Pop the 3-1/2 inch floppy into the PC, run setup, start the program, set the COM port and you're up and running! If your PC doesn't have a floppy you can download the interface software from the 'net.

Usually the business end of a radio is the front panel; in the case of the RX-320 it's the *rear* panel.

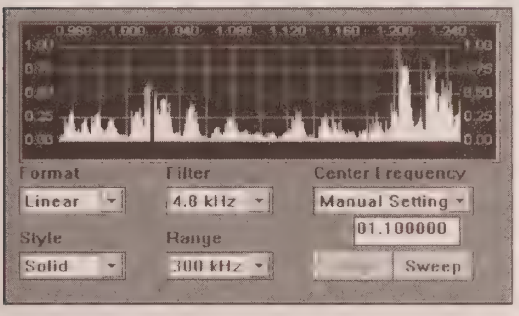
❖ Interface

The manufacturer-supplied software is quite reasonable in terms of quality, features, and performance; it's excellent for getting your toes wet with this rig before you go on to choose the software that really makes your boat float! Not too simple, not too fancy, it won't scare the neophyte and it won't disgust the experienced listener. The interface offers a virtual front panel display for the radio that resembles a real Ten-

Tec box and offers many of the controls you'd expect to find on a physical radio.

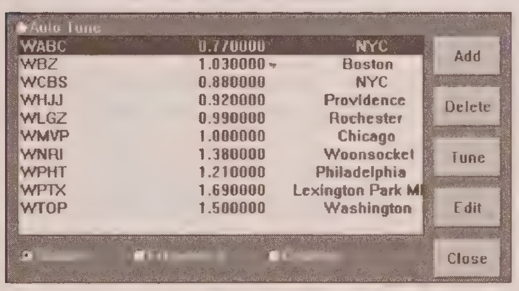


Where things start to get interesting is when you check out the 'Spectrum' and 'Memories' options –



Format: Linear
Filter: 4.8 kHz
Center Frequency: Manual Setting
01.100000
Style: Solid
Range: 300 kHz

'Spectrum' (above) is a dandy little application that will quickly mute the radio, sweep it across a user-selected portion of the radio spectrum and plot the results in graph form. Here I chose the local AM band as an example. You can see just where the activity is and clicking on a peak with your mouse tunes the radio to that frequency.



WABC	0.770000	NYC
WBZ	1.030000	Boston
WCBS	0.880000	NYC
WHJJ	0.920000	Providence
WLGZ	0.990000	Rochester
WMVP	1.000000	Chicago
WNRI	1.380000	Woonsocket
WPHT	1.210000	Philadelphia
WPTX	1.690000	Lexington Park M
WTOP	1.500000	Washington

"Memories" is the control for a nice, simple frequency database you can configure as you like that will work interactively with the '320.

❖ What's inside

Ten-Tec did a nice job of designing the radio and managed to achieve a good balance between cost of manufacture, price and performance. Like many modern radios (later than, say, 1996 or so), when you crack the lid and take a look inside you are struck by the Spartan appearance of the boards. (You suffer the same effect, only far worse, when you look inside the high-end Watkins-Johnson HF-1000 or the Ten-Tec RX340, because they are equally spare-looking but cost about $4,000 each!)

❖ How well does it work?

I'd say that it does extremely well overall; the price/performance ratio is extremely good. It's an excellent SWBC radio and with the stronger broadcasters you can open up the bandwidth to improve fidelity to equal or exceed that of your car radio on AM. It does very nicely on sideband, stability is excellent, and the wide selection of IF filters helps winkle stuff out of the mush.

Most useful of all, it's also very capable as a receiver for digital utility transmissions as well. This radio combined with your PC's sound card makes for a very nice starter station for ALE, HFDL, RTTY, PSK31 and SITOR decoding – I'd have happily assassinated any given individual for this kind of capability at this price just fifteen years ago.

I tested the '320 against an ICOM R-75, both radios being fed from a Stridsberg HF multicoupler; anything the R-75 could hear was equally listenable on the '320. This is a $300 radio that acquits itself creditably against devices costing much more.

The only negative observation I have to make against this radio is that sensitivity below about 1.2MHz drops off fairly quickly. This is a combination of two things – deliberate design to prevent troubles with overload – and minor miscalculation – it dropped off more than was anticipated. Modifications to correct this do exist and information is available on the Internet on how to perform them. Users who have performed these modifications have stated that the radio goes on to perform very well across its entire frequency span as a result.

Pros –
Very good performance/cost ratio
Stable
Extremely flexible due to wide range of interface software availability
No image problems (normally a bugbear of radios in this price range)
34 IF bandwidth filters from 300 kHz to 8 kHz are available to the user
Tuning steps down to 1Hz available (again, not normally available in this price class)

Cons –
No RF attenuator available
No RF gain control
Sensitivity drops off drastically below 1.2 MHz
Comparatively slow 1200 Baud serial interface

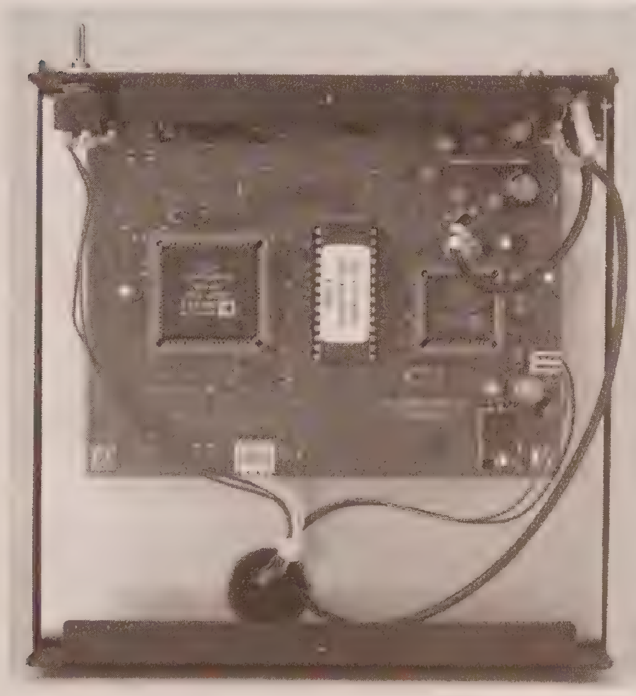
But wait! There's more! (As they say…)

❖ Two interesting late developments

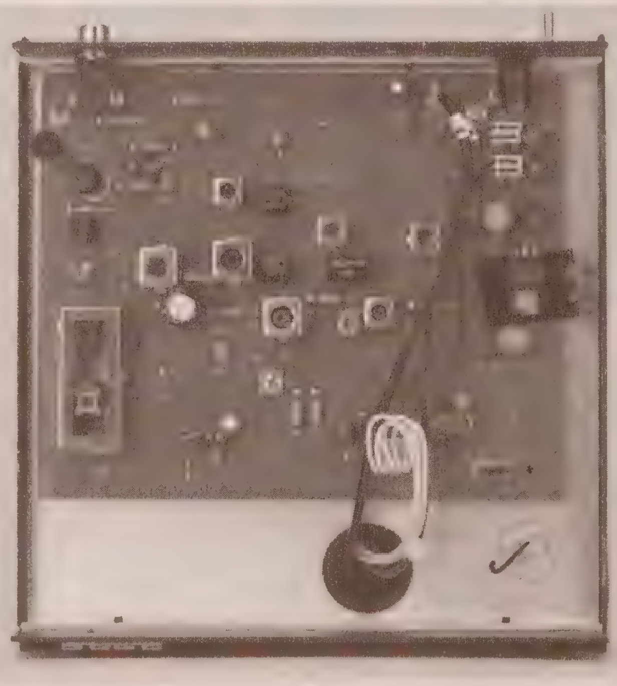
First of all, the basic RX-320 has been established as being easily modifiable to provide the 12kHz IF output required for DRM reception (DRM is a digital audio transmission mode that bids fair to become the transmission standard of the future on shortwave)! I've tested this myself – it's easy and it works – all you need once the mod is done is the DRM decoding software, which is available in both commercial and shareware versions.

Secondly, I think Ten-Tec must have been spying on the listener/hacker community; a new model replacing the RX-320 – the RX-320**D** – has been announced that already has the DRM modification incorporated into it *plus* the RF front end has been modified to fix the lack of sensitivity at the lower frequencies.

In summing up, this is an excellent radio at a great price ($300) with a large amount of third-party front-end software available for it that effectively turns it into many different radios (see following page). Not only does it cover the shortwave bands well, it can now also keep your listening up to date by handing you the ability to receive DRM signal on a platter! What's not to like? I just wish I had a few more of 'em in the shack!



RF board



DSP Board

Software for the RX320

By Lee Reynolds

You may have read the foregoing observations on the basic, out of the box Ten-Tec RX-320. Now I'll cover the aspect of owning such a radio that's the *real* fun – all the different front end control packages you can get for the device. That's the way you interact with your radio, and (unlike a traditional radio) if you don't like the ergonomics of your rig's software you can just drop in another front panel and set of abilities to replace the disliked one!

Some packages suit the needs of program listeners, others are aligned more with the interests of utility fans; one or two even serve the listener who wants to put his radio onto the Internet! A lot of software is available for this radio, so let's get down to it. I'll be assessing programs for the Windows 98 (or better) environment only this time around, but I know there are a least a *few* pieces of software out there for running the '320 with a Mac or LINUX box.

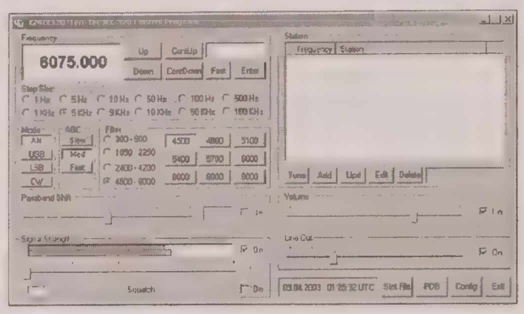
❖ Freeware Programs

GNRX320 is a nice piece of code that was written by Gerd Niephaus. It's stable, easy to install and is light on system resource use, so you'll easily be able to run it on that old Pentium 200 system you have in the basement. The front panel layout (below) is clean and intuitive, although lacking any on-screen simulation of a tuning knob (mouse wheel frequency tuning has been added with version 1.30, though!). Access to all available filters, tuning steps and other RX-320 functions is provided. Gerd also added an implementation of passband tuning that can be quite useful. This program has two useful add-on programs that make it of interest to both the program *and* utility listener –

GNPDB – a database for displaying and manipulating the ILGRadio broadcast database. It can be used in standalone mode if you so desire, but if used with GNRX320 it can be used to look up the frequency that the RX-320 is tuned to *or* it can tune the RX-320 to frequencies of interest you are finding in the database.

GNKFDB - uses the Klingenfuss "Super Frequency List" database (this one's good for utility listeners!). It works in a similar way to GNPDB but is limited to tuning the radio to the result of searches in the K'fuss database – you can't get the database to look up a frequency you've just set the '320 to.

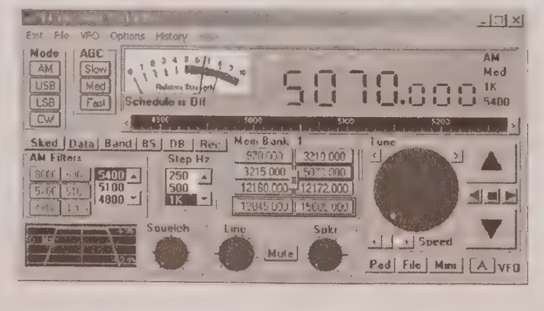
All in all, solid, easy to use, and the add-on programs make it a very useful program for the general-purpose listener.



RX320 is, again, a nicely done piece of code. A '320 enthusiast by the name of Clifton Turner wrote it but he hasn't produced any updates for it in a while, maintaining that the final version(s) have been released. Installation is simple. All '320 features are available and the software adds a few more that the '320 alone cannot provide, such as a tuning scheduler, passband tuning, bandscope, a miniature controller that occupies minimal screen real estate, easy to program memory buttons, automatic filter selection by mode and programmable data mode (FAX, RTTY, etc.) frequency offsets. Again, there's a useful ancillary program available –

DB320 – an interactive ILGRadio database for use with RX320. Again, crafted to work with its companion '320 program, the database will automatically look up the frequencies you tune your '320 to or tune the '320 to frequencies you look up in the database.

This program works well and presents an appearance that's more radio-like than the one shown by RX320. You may find it more familiar and usable as a result. A good workhorse for the program listener.



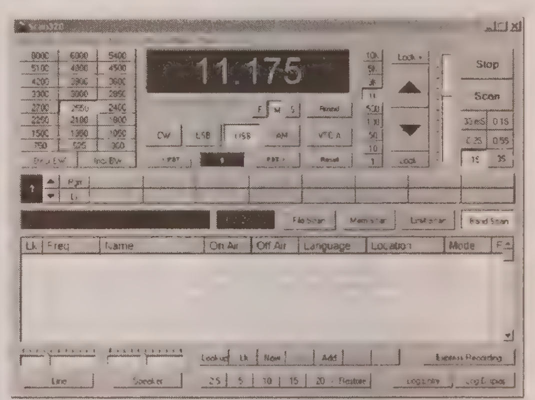
SCAN320 – written by Tom Lackamp, SCAN320 was created (as the name suggests) to address the needs of those who want to be able to scan a number of different frequencies. The basic '320 hardware has no built-in ability to perform scanning itself, but this program adds LF/HF scanning as well as anything in the consumer-grade market can. Squelch-based scanning *isn't* implemented in this package, but five different modes of scanning are available – memory, band, limit, continuous and file scanning (where the file can be a file created by the RX320 program above!)

Again, the "front panel" model owes more to Windows than to physical receiver design. Additional features include fully programmable tuning/recording (and scheduling thereof), dual range S-meter, dual VFOs, 24 direct access filters, passband tuning and 160 scratchpad memory positions. There's also a nice add-on or two –

SCAN320DB – once again, an interactive database access tool that works with SCAN320. This particular database front end is a little different in that it possesses a receiver mini-control panel that it displays along its top edge. You can minimize SCAN320 and run all operations entirely from the database viewer itself.

B-LOG – is an integrated logging utility that works nicely with the other two components. If you've been looking for a logger but didn't want to spend too much money, the price for this one can't be beaten.

This program is definitely one for the utility listener who wants to monitor a number of frequencies for activity.

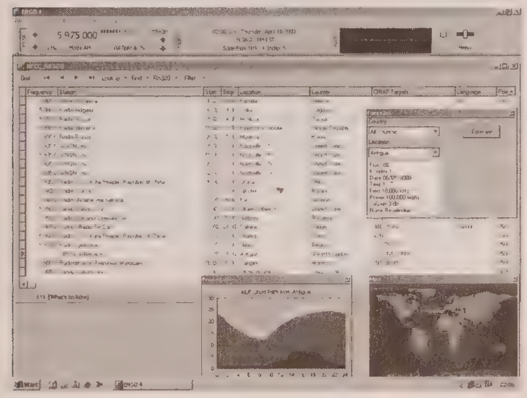


❖ Commercial Offerings

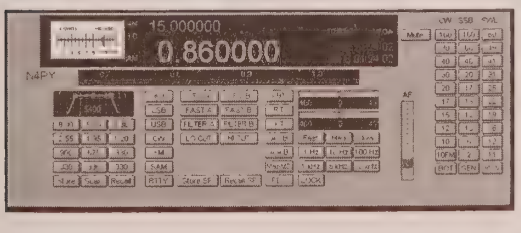
First up is ***ERGO 4.0*** – from Creative Express (http://www.swldx.com). ERGO is a very interesting approach to computer-radio integration that was designed with the program listener in mind, I think. This program can provide a simple receiver control panel for a number of different radios along with built-in interfaces to the ILGRadio database, HFCC database, Fineware SWBC files and Whamlog database. All these databases make for a *very* comprehensive index of what's on when and where on the bands, and via which transmitter sites.

ERGO also has some very useful built-in propagation tools that access Internet data sources for up to the minute forecasts which are then used to give you nicely integrated visual displays of signal paths between two points and the usable frequencies between those points. Good stuff if you're trying to get that elusive signal from Nibi-Nibi and need to know when your best chance of hearing it will be. Add in the ability to process received audio using the DSP abilities of your sound card, linking audio clips to database and logger entries, and receiver control via a local network or the Internet – you've got something that's definitely worth a much closer look.

This package is for the hardcore SW broadcast band DXer – with the full complement of databases and its real-time propagation forecasting abilities, it'll tell you when and where *you* should be listening for that elusive DX target! It also supports a number of radios other than the RX-320.



N4PY – is the brainchild of N4PY, Carl Moreschi (**http://www.ralabs.com/n4py/**) who produces control software for the Ten-Tec range. If you've grown used to the software that Ten-Tec provided with the RX-320 you'll find that this package bears a fairly close resemblance to it in certain ways. This product *will* run under Windows 3.1 - unlike any of the others – and displays modest system requirements. Passband tuning is implemented, one touch selection of a band is useful and a bandscope is implemented. This is a "fewer frills" package but is quite workmanlike in its attitude to getting the job done. If you own a Ten-Tec Pegasus then this software can run the Pegasus as the host radio and use the RX-320 as a client that will follow tuning changes on the Pegasus. No integration/link with the ILGRadio database exists.



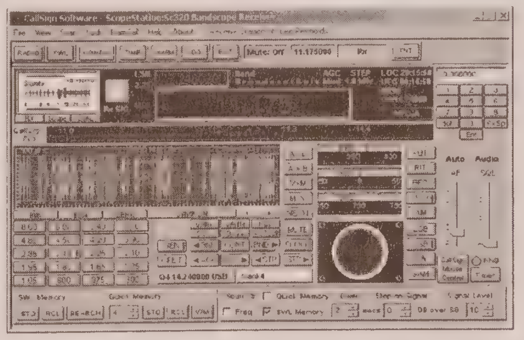
If you want more than the basic Ten-Tec software can offer but you aren't looking for a replacement with a steep learning curve, then this package may be of interest to you.

SCOPESTATION 3.00.08 – comes from CallSign Software (**http://www.callsignsoftware.com**) and is a member of a range of products made for the Ten-Tec Pegasus, Jupiter, RX-350 and RX-320. This beast has a radio amateur heritage (as you can tell by looking at the design of the front panel) and a feature that makes it particularly well suited to the SWL who has an interest in the ham bands (as well as SW in general). All typical functions are supported well with some additional capabilities that are very welcome. Support of the ILGRadio database is provided – interestingly, so is support for the HamCall radio amateur CD database.

The S-meter is *extremely* tweakable (so much so that I defy anyone to say that it can operate in a way that they *don't* like, once they're done setting it up to their taste), and a very thorough frequency calibration procedure is available for making sure that your '320 is absolutely spot on at all times.

CallSign has also performed a number of neat tricks with band sweeping and signal sampling – you have the conventional frequency sweep and display with the ability to click on interesting looking peaks to tune to a given frequency, more unusually you also have a signal sampling mode that allows you to take a close look a the waveform of any signal you're listening to. (I understand that some users are simply fascinated by this trick!) Another good touch is that have having the software automatically set a zero baseline for signals when using the 'scope helps compensate for unusual noise levels, etc. ADIF file format support is included as well; this enables you to import data from a number of amateur and SWL related programs.

This is a good package for the guy who likes to get into to the nuts and bolts of things and who likes to heavily customize the way the virtual 'front panel' works. A tinkerer's delight!



WORLDSTATION 3.1 – produced by DXtra, Inc. (**http://www.dxtra.com**) this is one package that I would very much liked to have included in this overview but the transition from WS2.0 to WS3.1 occurred at just the right time to prevent me from being able to review the newest version. I own 2.0 and like it a great deal; it offers features that I haven't been able to find anywhere else, but I'd have been reviewing a copy of something that is no longer current. 3.1 promises some remarkable band scanning and multi-radio management capabilities – I'll report on this one at a later time, editor permitting!

Okay, that's a quick take on what's out there for the RX-320 aficionado. Additional packages do exist but space does not permit me to include them all. You might try a web search for –

N4PY
Privalov/Control Panel
Rxtra320
RX320/PDA (Yes, software exists that runs on your Palm Pilot!)
RxWings
DXRadar (Not, strictly speaking, a control package, but it performs a fascinating function!)

I've used all of the above programs and own all but one of the commercial ones. Choosing between them can be difficult, because almost all offer something that, to me, qualifies as a "killer app"! Do some judicious research, kick the tires on a few of these programs and form your own conclusions, but, most importantly, have fun doing so! I did.

This is your equipment page. Monitoring Times pays for projects, reviews, radio theory and hardware topics. Contact Rachel Baughn, 7540 Hwy 64 West, Brasstown, NC 28902; editor@monitoringtimes.com.

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Midland's Excellent WR-30 FM/Weather Radio

If you don't have a weather radio with alert capability in your household, you need one. Period. Bad weather happens in every state in the Union, and sometimes it just plain sneaks up on us, either because we are too busy attending to the stuff of everyday living or because bad weather or some other calamity arises with incredible speed.

Of all the money that flows from our pockets into the coffers of government, one of the very best deals we get is NOAA Weather Radio. In January 1975, NOAA Weather Radio was designated the sole government-operated radio system to provide direct warnings into private homes for both natural disasters and nuclear attack.

NOAA currently broadcasts weather information 24-hours a day on more than 480 FM transmitters in fifty states, Puerto Rico, the Virgin Islands, Guam, and Saipan. NOAA Weather Radio also broadcasts warnings, as well as post-event information for all types of hazards, both natural (such as earthquakes, tornados, or volcanic activity) and technological (such as chemical releases or oil spills). Seven frequencies are used: 162.550, 162.400, 162.475, 162.425, 162.450, 162.500, and 162.525 MHz. Currently, an estimated 70-80% of the population is within range of a NOAA weather radio station.

I've had a weather radio receiver in one form or another since the early 1980s. The first one I had received only three channels, and if you wanted to know if there was foul weather brewing, you had to turn it on and listen.

Then came radios with alert capability. They would sit quietly "listening" until the local NOAA Weather Radio station transmitted a special alert tone. The radio would then "wake up" and let you hear whatever bulletin was being transmitted.

That was a big step forward, but it had one serious drawback: you would hear the alerts for all of the counties in the local forecast area. I live on the eastern edge of a forecasting area that includes a couple of dozen counties, and in general weather tends to move into our area from west to east. As a result, I hear alerts from counties to the far west that may have nothing to do with my local area and – even if the hazard is moving my way – may not be of concern for several hours.

The Weather Service's Specific Area Message Encoding (SAME) solves this problem by allowing special NOAA Weather Radio receivers to receive only those alerts for the counties or areas that you program into the receiver. SAME blocks out the extraneous alerts that don't pertain to your area and allows you to hear the ones that do.

❖ The WR-30 Weather Radio

And that's where Midland's Model WR-30 Weather/Hazard Alert Radio comes in. Measuring 7.5 inches by 5.25 inches by 1.75 inches, it is a "tabletop" weather radio receiver in a handsome gray plastic case (although it comes with a bracket that also allows it to be mounted to a wall).

The WR-30 receives 7 weather channels, has alert and SAME capabilities (it can store up to 20 different SAME codes), and also receives broadcast FM from 87.5 to 108 MHz. Unlike some weather radios that also receive FM, the WR-30 displays the digital frequency of the station being received. If you are listening to FM radio, it automatically switches to weather/hazards alerts when they come through.

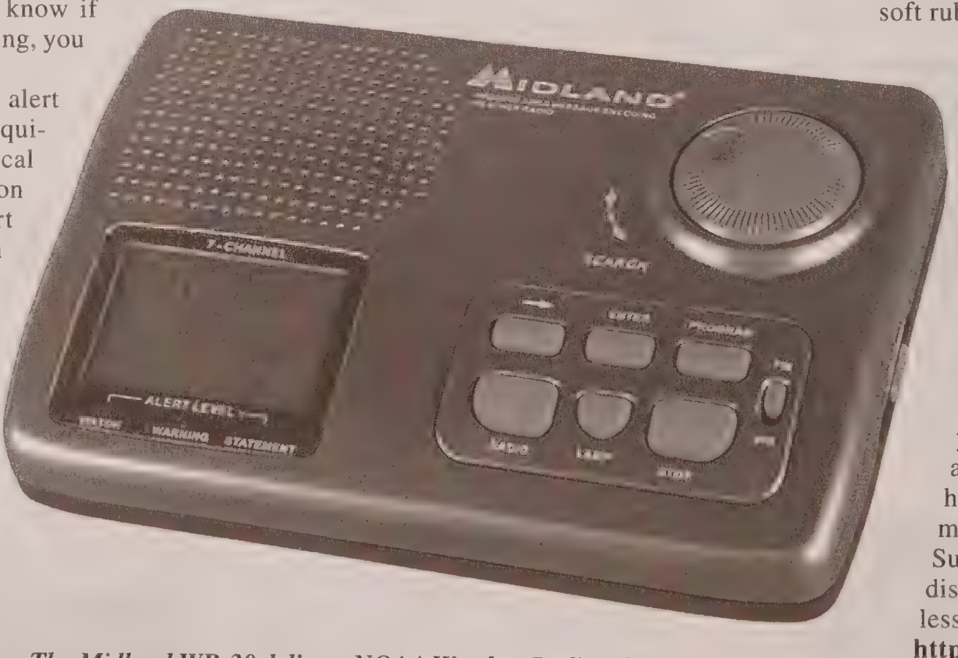
The WR-30 comes standard with a wall wart transformer power supply, but also takes four AA batteries for backup so it can still receive even when the house power is out. That also means if severe weather forces you to take cover, you can grab the WR-30 and use it as a portable powered by its own internal batteries.

The layout of the WR-30 is very straightforward. At upper left of the front panel is a speaker grill. At the upper right, you'll find a rotating disk with a dimple. It's used for changing various settings on the WR-30, such as time, weather channel, SAME code, and FM frequency. At the lower left is a backlit liquid crystal display that shows the time, FM frequency, and status of the radio. It also displays up to 56 different messages. Below the LCD are three LEDs that light to indicate which type of alert is active: watch, warning, or statement. The WR-30 can also be programmed to disable certain watch code alerts.

At the lower right of the front panel are six buttons: an arrow, ENTER, PROGRAM (these three are mainly used to program the WR-30), RADIO (turns it on), LAMP (activates the backlighting), and STOP (which stops the emergency tone). Next to the six buttons is a switch for choosing between FM and Weather Radio. The volume control is a slide switch on the right hand side of the case.

On the bottom of the WR-30 are four soft rubber feet to protect the furniture and a hatch for loading the backup batteries. On the back panel are jacks for the power supply, an external antenna, an external alarm and an external speaker, as well as the telescoping rod antenna.

That's it: it's simple, well-designed, easy to program, and it works extremely well. If you don't yet have a weather radio with alert capability in your household, I can certainly recommend the Midland WR-30. Suggested retail is $79.95, but discounters may have them for less. For more information, visit **http://www.midlandradio.com**.



The Midland WR-30 delivers NOAA Weather Radio, alert and SAME capabilities, and FM reception in an attractive package.

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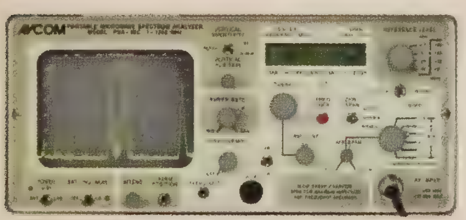

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Ask any surveillance countermeasures expert -- the spectrum analyzer is the most valuable piece of equipment in his bug-detection resources. At a glance, the technician can read the spectrum, spot nearby signals, identify their source, and even listen to them. Sweeping for surreptitious transmitters has never been easier, and test labs can't own a more economical and versatile instrument than the Avcom PSA 65C.

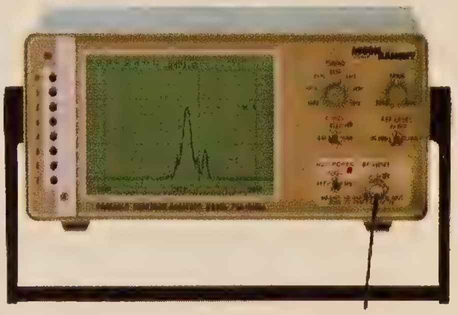
Now you can own the leading spectrum analyzer used by communications installers, test laboratories, scientific institutions, and surveillance/countermeasures teams. AVCOM microprocessor-controlled spectrum analyzers have earned their reputation as a best buy--the lowest cost, high performance spectrum analyzer on the market!

With wide frequency coverage *(1-1250 MHz in one sweep!)*, real-time display *(30 sweeps per second grabs the shortest bursts!)*, backlit digital frequency display *(100 kHz accuracy)*, high sensitivity *(5 microvolts)*, AM/FM reception on internal speaker, drift canceling AFC, 5" green-trace CRT, 120 VAC/12 VDC power, rechargeable battery with built-in recharger.

Avcom PSA-2400A Spectrum Analyzer

Designed for spectrum analysis, interference locating, and antenna alignment of wireless video cams, ISP wireless networks, microwave links, Bluetooth, broadcast links, and wireless LAN signals in the 2.4-2.5 GHz spectrum.

The new, compact (9.5"W x 4.5"H x 9.5"D), lightweight (8 lbs) AVCOM PSA-2400A is visible in sunlight or backlit for nighttime use. The high-contrast LCD screen (5.7" diagonal, ¼ VGA) offers sharp resolution, and its three-way power supply (85-264 VAC @ 47-440 Hz; 9-15 VDC; internal 6V gel cell battery) makes this versatile test instrument a natural for the field technician. An on-screen menu offers seven different functions which can be modified for custom display characteristics.



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What's NEW

Tell them you saw it in Monitoring Times

Small radio, Big sound

Building on technology pioneered by Henry Kloss, Cambridge SoundWorks has announced the new SoundWorks 730 radio with a sound like a "component stereo in a cigar box." The *SoundWorks 730* uses high-performance speakers, contoured amplifiers and a built-in powered subwoofer to reproduce music with remarkable accuracy. The sound is rich, realistic and warm. "It simply sounds much bigger than it looks," says the company promo.

FM1
104.1
3:49PM

The secret is in a powered subwoofer which takes up over half the radio's cabinet, providing great bass. Output can be further adjusted through separate bass and treble controls.

Although the 730 does not come with a built-in CD player, it does provide an auxiliary input for MP3 or CD player. Additional connections are a mixing stereo minijack, jacks for external AM and FM antennas, and a Record Out stereo minijack.

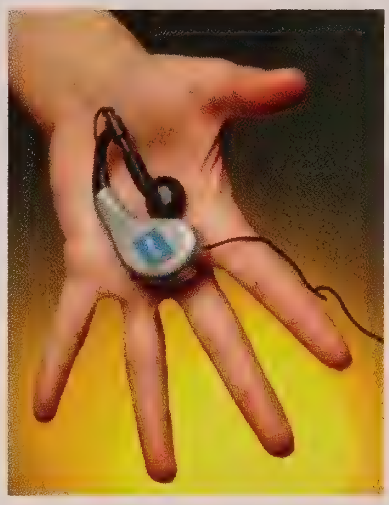
Dual alarms can be set for wake-up to music or tone. The 32-character display includes radio station information from the Radio Data Service (RDS). The SoundWorks Radio comes with a compact remote control, and is available in black or ivory case. Cambridge SoundWorks backs the radio with a 45-day trial period and a one-year warranty.

The SoundWorks 730 retails for $249.99 at retail locations, on the internet at **http://www.hifi.com**, or by calling 1-800-945-4434 (1-800-FOR-HIFI); outside the US: 1-978-623-4400.

Small Radio, Big Ideas

Two University of Pennsylvania graduates have hit the ground running. One year out of college, Michael Schwartz and Jaron Jerikson-Rhodes have formed a company, engineered new products, found manufacturers in China, and tested new approaches to acquiring customers.

Using Radio Shack parts, the two constructed a tiny FM radio that fits over an ear much like a hearing aid. Schwartz said the company has already sold 20,000 of the radios, which they dubbed the Lobeman.



Part radio and part headphone, it is being marketed as both a radio and a media service. Many of the radios sold have gone to public radio stations who use the radios as a fundraising premium. Schwartz is also attempting to get large sports stadiums to offer Lobemans to fans along with an in-stadium private network broadcast service that would be dedicated to the event.

You don't have to put your logo on it to get one, though. Single sales of the "beta" model are available for $15 (shipping included) through their web site **http://www.lobeman.com**. Watch these guys for future innovations. "We're interested in those things that are small, simple and easy to use," Schwartz says.

BCi 25D Digital Card

MT's reviews of the Uniden BC250D and 785D scanners did not include a review of the APCO-decoding function provided by the optional digital card. Recently, however, assistant editor Larry Van Horn traveled with the 250D and was able to test it on several APCO systems. How did it work? Larry's review is summed up easily: "It works fine once it is set up."

His comment refers to an apparent malfunction experienced by several users when trying to decode APCO signals. As posted on Strong Signals by M.B., Uniden's technical support explained, "This is not a problem with the BCi25D card or the BC250D. The problem stems from the units not properly being set up to monitor APCO 25 systems.

"In the packaging of the BC250D there is an addendum sheet which explains that, after the BCi25D has been installed and the scanner has been programmed with the proper frequencies and talk groups, the user must adjust the Sound Quality Fine Tuning to match their system. If they do not do this, they might not be able to hear intelligible voice communications."

Multimedia Ham Logging

DXtreme Software is one of the few companies to take radio monitors seriously enough to design software especially suited for reception logging and reports across the spectrum from long to short waves. But they excel in amateur radio logging software, too.

DXtreme's newest offering for hams is DXtreme Station Log – Multimedia Edition. Station Log not only provides the features you'd expect of a good logging program – logging contacts, importing ADIF from contest programs, generating and tracking QSL reports and replies – but it adds audio and graphic dimensions as well. Station Log lets hams create and maintain an audio archive of memorable contacts for playback at any time.

Just because computers and internet connections enable hams to skip the expense and delay of postal systems, this does not mean they have to give up the pleasure of giving, receiving, and displaying attractive QSL cards. The integrated QSL imaging facility lets hams scan the physical QSL cards they receive through regular mail as well as electronic QSLs received over the internet. These digital images can be stored and displayed at any time. You can also create your own electronic QSL or you can print out a physical QSL.

Of course, many other features and a variety of reports are supported by this software, which covers most amateur QSLing and contesting needs. Station Log runs in Microsoft Windows XP, and retails for $79.95 USD in North America ($82.95 USD elsewhere), shipping included. For more information or to order by credit card, visit **http://www.dxtreme.com** or call 1-510-658-5244 (phone charge of $5), or send check or money order to DXtreme Software, 26 Langholm Drive, Nashua, NH 03062.

Science Books

Reviews by Bob Grove

During the spring, most of us are looking forward to getting outside again. I teach geology at two local schools, and am always looking for good reference materials. If you enjoy the earth sciences as much as I do, these two dictionaries from McGraw-Hill are excellent references for the lexicon of these studies. Look for them at your favorite book store.

DICTIONARY OF EARTH SCIENCE

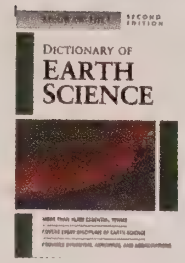
Second Edition, $19.95

Earth science as a discipline embodies the dynamics of our planet in a broad stroke; from storms to rivers, and mountains to oceans, our earth is a dynamo of nature. Terms like geomagnetic, plutonic, Gondwana, superposition and eo-

What's NEW

Tell them you saw it in Monitoring Times

lian may not be everyday vernacular for the earth scientist, but are handily found and easily defined in a concise work like this dictionary.



Explaining more than 10,000 essential terms of earth science, the dictionary covers every one of the many disciplines which define the broad field of earth science. Synonyms, acronyms and abbreviations are included, and an excellent appendix provides quick-look-up tables of specifications for the earth's major rivers, mountains and lakes.

Included as well are charts of composition of the earth's crust and its rocks, the table of geologic time, historical notes on famous volcanoes, and an exhaustive conversion chart for standard units of measure in the international, U.S., and metric systems of measurement.

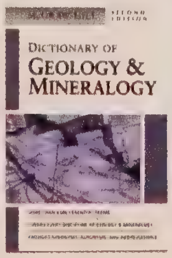
All in all, a nice, compact, informative reference on the broad brush drawn by the earth sciences.

DICTIONARY OF GEOLOGY AND MINERALOGY

Second edition, $19.95

If you think electronics and radio has a huge vocabulary, wait until you try geology! I first learned the basics nearly a half century ago, and when I recently decided to update my knowledge to teach it, I was in for a surprise! Not only were there new terms (metasandstone) for old rocks (metamorphic sandstone), but new terms (plate tectonics) for old theories (continental drift) as well! Clearly, I had to start all over.

But by my side is a new reference that makes it all that much easier—a dictionary, completely up to date with the latest terminology and definitions. And along with those 9000 or so definitions is a comprehensive appendix showing the periodic chart of the elements, a table revealing the latest model of the layers of the earth, the Mohs scale of mineral hardness, and other handy reference charts as well.



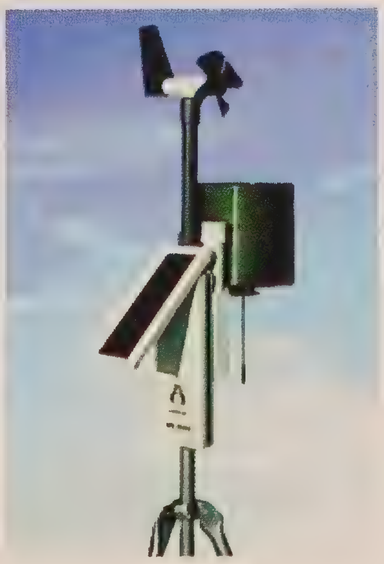
This is a volume that belongs in every geology classroom, and every rockhound's library.

Wireless Weather Station

If you're going to be outdoors amongst the rocks, you're probably going to have an increased interest in the weather. And chances are, the best place to erect a weather station is not going to be a convenient spot to read the results, which means stringing lots of wire ... unless you have Edmund Scientific's WS-2000 Wireless Weather Station.

This nifty set-up is designed for positioning the sensors on your roof where there are no obstructions. Best of all – in case you're envisioning climbing on the roof to change batteries – the station is solar-powered! WS-2000 measures wind speed, wind direction, temperature, barometric pressure, rainfall, and relative humidity. Data is transmitted on a frequency of 418 MHz with a range of up to 400 feet.

The receiving unit can calculate wind chill and dew point and records minimum/maximum; these data can be displayed with time and date provided by an internal clock/calendar.



The WS-2000 Wireless Weather Station is $849.95; the software plus wireless computer is $249.95; a mounting tripod is $34.95. Contact Edmund Scientifics, 60 Pearce Ave., Tonawanda, NY 14150-6711; 800-728-6999: **http://www.scientificsonline.com**

High Performance CB Antennas

For folks who rely on it, there are times when CB performance is critical, and the antenna is often the most overlooked piece to the performance puzzle. K40 Electronics offers real-world, proven antenna technology in their high performance CB antennas.

K40 Electronics offers several different models. The K40 Trucker center load antenna is designed specifically for the professional driver looking for maximum performance. For drivers looking for economical, fiberglass solutions, K40 offers the tunable Power Whip and Superflex Whip antennas.

The K40 Trucker center load CB antenna has a solid, 8-gauge, 100% silver-plated coil with a large surface area for lower resistance and less RF signal loss. With its lower resistance, the K40 Trucker antenna delivers higher efficiency and more gain on every channel for further transmission distance and reception clarity than other antennas on the market. Other features include: 7000 watts AM power handling capability, tunable design, frequency range of 26-30 MHz, 1.6 MHz bandwidth, 1/4 wave length design, 49-inch stainless with tapered 17-7 ph whip, weather band reception, and sealed housing for durability. The K40 Trucker antenna has a quarter-turn quick release and comes backed by a five year materials and workmanship warranty. Suggested retail price is $69.95.

The principle advantage of the K40 Superflex Whip is its ability to withstand extreme shock without breakage. In fact, the 4 foot model can be bent into a perfect circle with both ends touching. This top loaded, tunable coil antenna comes in 1/4" fiberglass rod in lengths from two to four feet, black or white color, and with varying power handling capabilities of up to 1,500 watts. The K40 Superflex Whip antenna has a suggested retail price range of $21.95 to $24.95.

The K40 Power Whip antenna is another top loaded, tunable coil antenna with solid 16 gauge copper magnet wire, 3/8-inch heavy duty fiberglass rod, special design for weather band reception, and a five year materials and workmanship warranty. Available in lengths from 2 to 4-1/2 feet, black or white color, and with varying power handling capabilities of up to 2,000 watts, the K40 Power Whip antenna has a suggested retail price range of $23.95 to $30.95.

Product and dealer location information can be obtained by calling K40 at 800-323-6768 or by visiting their website at **http://www.k40.com**.

Books and equipment for announcement or review should be sent to " What's New?" c/o Monitoring Times, 7540 Highway 64 West, Brasstown, NC 28902. Press releases may be faxed to 828-837-2216 or emailed to Rachel Baughn, editor@monitoringtimes.com

VIEW FROM ABOVE

WATCHING THE WEATHER SATELLITES

Lawrence Harris
lawrenceharris@monitoringtimes.com

Memories of Winter

If you thought that the North American winter was colder than normal, you were probably correct. Weather satellite pictures of scenes over the continent show the extent of ice and snowfall. The entire surface areas of Lakes Superior, Huron, and Erie froze over for the first time in years. The intense cold delayed the opening of the St. Lawrence Seaway and probably the start of the growing season near the Great Lake shorelines.

Although the open surface waters of Lake Michigan did not freeze, the southern portion experienced a higher than normal amount of ice. Winds and currents then drove broken pieces of ice from the north to the south.

Figure 1 is one of the images taken from the International Space Station: it shows a number of large pieces of ice collected along and just off of the shoreline southwest of Benton Harbor, Michigan. There is ice accumulation along the entire eastern shoreline of Lake Michigan, as well as the wind-driven lake-effect snow cover over the western half of the lower Michigan Peninsula. Taken with an electronic camera fitted with 28mm lens, the image is provided by the Earth Sciences and Image Analysis Laboratory at Johnson Space Center. Other images can be viewed online at: **http://eol.jsc.nasa.gov**

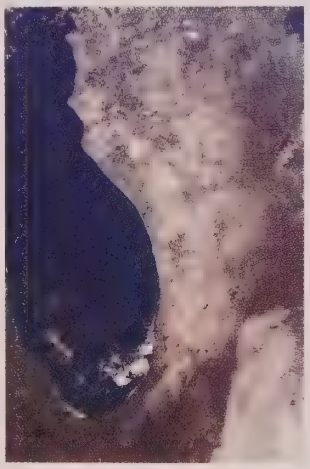


Fig 1: Picture from the ISS showing ice on Lake Michigan on February 21, 2003

## ❖ GOES-12 becomes GOES-E

On Tuesday April 1, 2003, at about 1815UTC, GOES-12 (previously referred to as GOES-M) replaced GOES-8 as the operational GOES (east) satellite. From that time, GOES-E imagery – see figure 2 – and other data (including soundings) became based on GOES-12. GOES-8 has been providing operational products since 1994, but has been removed from its orbital location and retired. Now activated as GOES-E, GOES-12 operates according to the GOES-E schedules and scanning strategies.

The transfer introduces some changes:

1. The resolution of the GOES-12 water vapor channel (3) is 4km, instead of 8km on GOES-8.
2. The central wavelength of the water vapor channel is 6.5microns, compared with 6.7microns on earlier satellites, and its spectral response is wider than before.
3. Channel 5 (4km resolution channel on pre-GOES-12 satellites) is replaced on GOES-12 by channel 6, a new 8km resolution channel.

For all GOES WXSATs between GOES-8 and GOES-P, channel numbering is based on frequency:

Channel 1 - visible light
Channel 2 - 3.9microns
Channel 3 - 6.5 or 6.7microns
Channel 4 - 10.7microns
Channel 5 - 12.0microns
Channel 6 - 13.3microns

Policy dictates that no GOES imager will have both channels 5 and 6; therefore, GOES-8 through -L have channel 5 and GOES-M through -O will have channel 6.

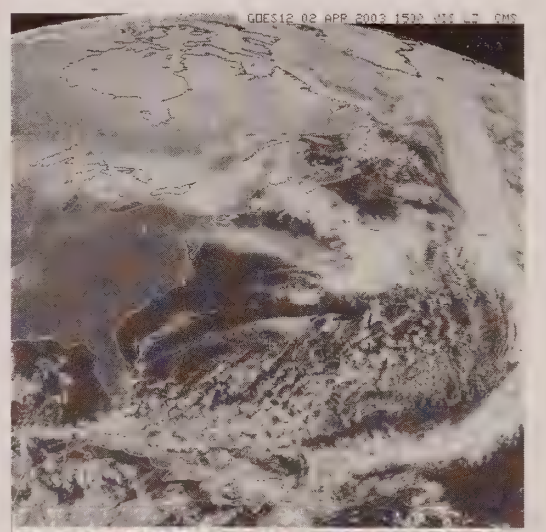


Fig 2: GOES-12 (east) image retransmitted via Meteosat-7

❖ NOAA channel switching

If you can watch the APT channels as NOAA-17 travels north into twilight, or channel 3 on HRPT, you will be familiar with the channel changeover effect. NESDIS (National Environmental Satellite, Data and Information Service) has reviewed the requirements for the use of AVHRR (Advanced Very High Resolution Radiometer) channels 3a and 3b on the operational NOAA satellites. A "best scenario" operating configuration has been determined for two-satellite operations for NOAA-16 and -17. From May 1, the new configuration will be as follows:

Afternoon satellite (NOAA-16) -
Channel 3b always on (no 3a switching).
Morning satellite (NOAA-17) -
Switch channels at the terminator such that 3a is on during daylight and 3b is on during night.

An analysis concluded that channel 3a is required from only one satellite, once per day, either AM or PM for most products and research needs for the next two years. The arrangement (with NOAA-16 and -17) was determined to be the best compromise to best address different requirements. It allows NESDIS to meet the 3b requirements for all products, and to provide continuous global coverage for fire detection and monitoring.

❖ Correspondence

Scott Bowen of Texas e-mailed that he is modifying his Radio Shack Pro-2034 receiver to receive APT. This is a utility receiver, so has the usual low-bandwidth filters that are too narrow for APT use, so he is trying to find a wideband 40kHz filter. I have known a number of people to successfully modify such receivers, and others who have managed to demodulate APT signals despite the basic unsuitability of the original receiver design.

❖ Meanwhile in Europe

Living on the south-coast of Britain, my "local" geostationary WXSAT is Meteosat-7. The new digital WXSAT MSG-1 (Meteosat Second Generation) was launched last year and, during commissioning, suffered an amplifier failure. As a result of this mishap, a significant change of plan was implemented. Both image data streams from MSG-1 – high and low resolution – are going to be transmitted from Hotbird, a European satellite television facility. This has had the immediate effect of prompting hundreds, if not thousands, of WXSAT hobbyists to set up Hotbird satellite television systems and to apply for permission to receive and decode the two data streams from MSG-1.

I have just joined the "rush" to get set up. My system arrived on the Monday as I was setting off for work, as also did my copy of the *Beatles Anthology* DVD (now I am showing my age)! A day or so later and I have tuned the software into Hotbird, but I have to wait for the paperwork to catch up before I can decode the test transmissions!

Frequencies

NOAA-12 and -15 transmit APT on 137.50 MHz (unless NOAA-12's footprint overlaps)
NOAA-17 transmits APT on 137.62 MHz
GOES-12 and GOES-10 use 1691 MHz for WEFAX

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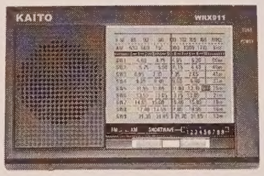

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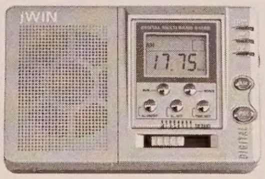

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Closing Comments

This page is open to thoughtful opinions on radio-related topics. Submissions should be about 800 words in length and may be mailed to Closing Comments, care of this magazine, or emailed to editor@monitoringtimes.com

With SWBC stations reducing their on-the-air broadcasts, and with the advent of DRM's spectrum efficient broadcasting mode, why do broadcasters need more spectrum space? Why are they fighting the amateur radio community's proposal to break out 300 kHz of space around the 40 meter ham band for worldwide use? These are some questions we'd like to ask the ITU.

HCJB Abandons North America and Europe

By Glenn Hauser

A bombshell was announced on the April 19 *DX Partyline*: after many months of study prompted by Dave Johnson, new director of parent organization World Radio Missionary Fellowship, it was decided to cancel English language broadcasts to Europe and North America after the end of May. English will remain on the air from Australia, but Quito productions such as *DX Partyline* and *Ham Radio Today* will also be terminated.

Thus ends a 72-year history of worldwide broadcasting from Ecuador, as HCJB's mission has been redefined to concentrate on Spanish, Portuguese and Quichua to South America. Remaining English production resources will be put into a language-teaching program. It was likely that a morning program in English would continue, perhaps audible into the southern US, but aimed at missionaries rather than the general listenership.

This results from an audit, not financial, but a "ministry audit" to review how the organization's resources should be spent. Less should be spent on SW, more on local stations, satellite network, internet ministry, was the conclusion.

It may be four or five years before the Pifo transmitter site has to be torn down, as construction of the new airport is delayed. Since HCJB no longer will be carrying out extensive SW broadcasts from Ecuador, Project SERVE, to build a new transmitter site on the coast at Santa Elena, has also been shelved, although the undeveloped property will be retained in case needed later. However, the possibility exists of setting up additional sites, such as the northeast coast of Brazil, or somewhere closer to the Caribbean.

One rationale put forward for this is that there is no dearth of Christian radio in the US, so HCJB is not really needed here. No argument on that, but HCJB is needed for at least a smidgin of Latin American culture and news presented in English. Unfortunately, that has always been secondary, and now, obviously, dispensable. Now we are left with nothing but Radio Habana Cuba, and (if we can get it), RAE, Argentina, as national external services in English from Latin America.

This is the gist of a conversation between Curt Cole, International Radio Director for the Latin American Region, and DXPL host Allen Graham. Cole concluded by saying:

"I know that some listeners will think this is the worst decision HCJB has ever made. But it was not made lightly. There have been months, years, of research. We do want to hear from everybody. Listeners are welcome to write to Curt Cole, or DXPL, to voice their opinion, but it will not be overturned. This is something we are going to do. Radio HCJB, Box 17-17-691, Quito, Ecuador, or dxpl@hcjb.org.ec Feel free to let us have it with both barrels; that's fine. Some will understand, some will not.

"Thanks to Allen for all the hard work he has put into *DXPL* over the years, one of our mainstay programs, and to all the previous hosts, a program that has had significant impact in the SW world. Don't blame Allen – it's not his decision. From those who believe in it, prayers are appreciated; these are not easy days."

Although not mentioned on this show, I'll bet one of the justifications for dropping English to North America was that the BBC did; Switzerland did; Germany did; it's snowballing.

Goodbye to one of the first shortwave stations many of us ever heard or QSLed – with its once outstanding signal almost every night. And to one of the most popular and long-running DX programs, now history along with those of WNYW, Radio Australia, Radio Sweden, Radio Netherlands, VOA. . . The final *DXPLs* are UT Sun June 1 at 0000 and 0300 on 9745.

FCC Allocates More Spectrum to HF Broadcasting

By Fred Maia W5YI

At the request of the National Telecommunications and Information Administration (NTIA), the FCC has tweaked its Part 2 Table of Radio Frequency Allocations to conform to international allocation changes made at WARC-79 (World Administrative Radio Conference) and WARC-92 that had not previously been addressed.

The most significant action taken by the Order was the reallocation of several bands of high frequency (HF) spectrum from the fixed and mobile services to the HF Broadcasting (HFBC) service. Also known as Shortwave or International Broadcasting, HFCB is a radio service licensed by the FCC to operate in the high frequency band. This is an international broadcast service where transmissions are intended to be received by the general public in foreign countries.

Throughout the world, there are hundreds of shortwave stations. Most governments operate one or more shortwave stations. Other stations are owned by religious organizations. Some are shortwave relays of a commercial AM or FM station intended for audiences in remote areas of that particular country. Very few countries license privately-owned shortwave stations that are designed to broadcast to foreign audiences. The United States is one of the few countries that permit such broadcasters.

In the United States, international broadcast stations transmit on frequencies between 5950 kHz and 26100 kHz. Unlike other broadcasting services where frequencies are assigned on a permanent basis, international broadcasters are assigned frequencies on a seasonal basis to account for changes in propagation conditions, changing programming needs, and interference conditions.

Internationally, 2930 kilohertz of spectrum in eight HF frequency bands are currently available to the broadcasting service on a primary, exclusive basis. Several of these bands were reallocated from the fixed service to HFBC at the 1979 and 1992 World Administrative Radio Conferences.

The Commission is now adding these international allocations to Part 73, Subpart F of the Rules. Consistent with international footnote 5.147, the Commission adopted a new United States footnote that would allow U.S. Government agencies to continue operating fixed stations in the bands 9775-9900 kHz, 11650-11700 kHz, and 11975-12050 kHz on the condition that harmful interference is not caused to the broadcasting service.

"This action significantly increases the amount of spectrum available to international broadcasters on a worldwide basis, thus facilitating the sharing of information and entertainment by people throughout the world," FCC said.

Worldwide HFBC Allocations (Eff. 4/1/2007)

5900-6200
7300-7350*
9400-9900
11600-12100
13570-13870
15100-15800
17480-17900
18900-19020
21450-21850
25670-26100**

* In Region 2 (North and South America), the band 7100-7300 kHz is allocated to the amateur service on a primary basis, but broadcasting is primary in Regions 1 and 3.

** At WARC-89, the band 25600-25670 was reallocated from the broadcasting service to the radio astronomy service.

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